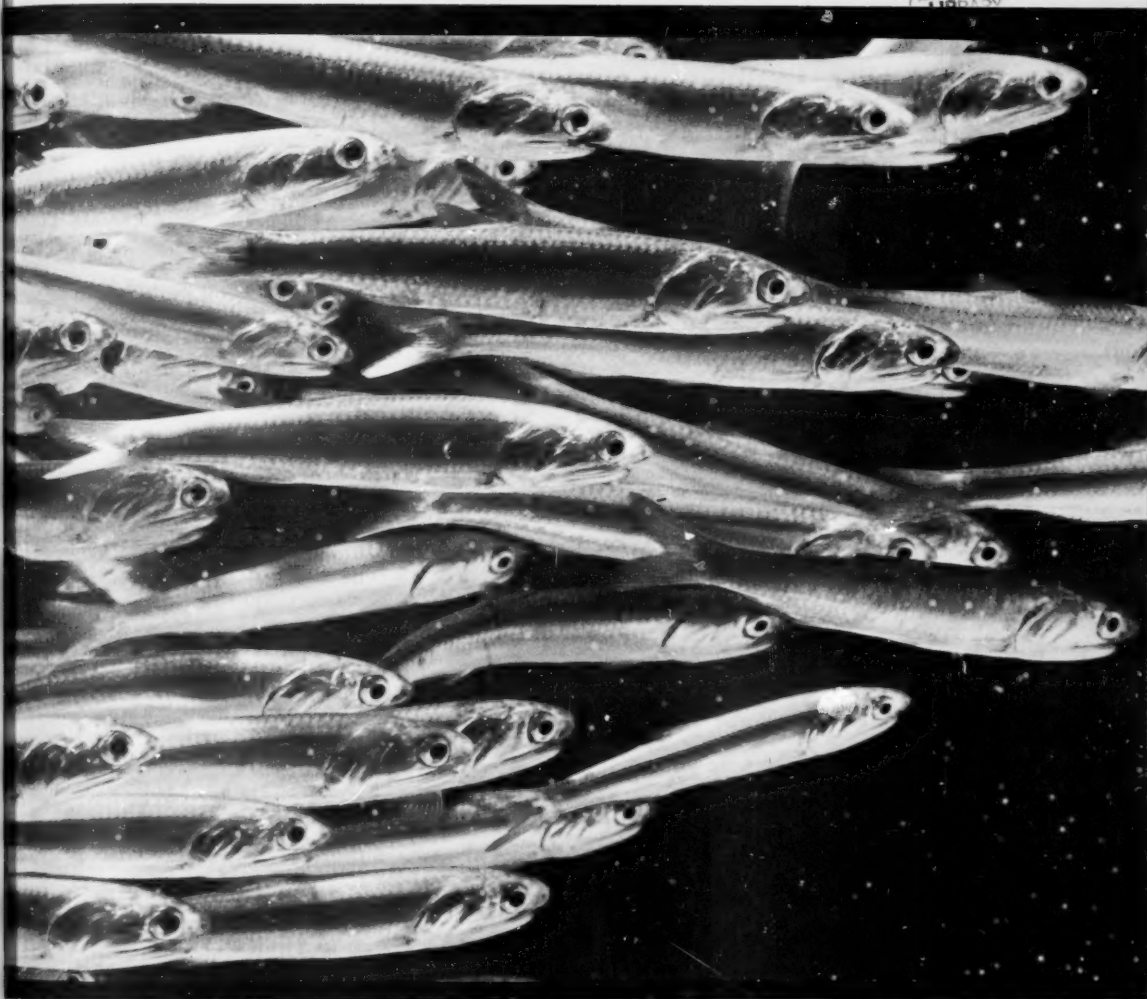


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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

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NEW APPROACHES TO QUALITY CHANGES IN FRESH CHILLED HALIBUT

By Max Patashnik*

ABSTRACT

Results of some new and simplified objective methods for measuring quality differences in iced halibut were compared with subjective or sensory methods. In this interim report to industry, the potential applicability of some of these results to industry practice is discussed. The quality aspects considered are freshness, raw-meat elasticity, cooked texture, and the abnormal chalky condition.

INTRODUCTION

Few data exist on the relation between the degree of freshness of halibut to its retention of quality during frozen storage. This information is needed to develop meaningful criteria for grading fresh halibut as landed, especially since halibut before final consumption may be held in ice for over 3 weeks prior to dockside delivery and may be additionally held in frozen storage for 1 to 2 years. To define the initial quality of the landed fresh halibut in subjective and objective terms and to relate it to the time-temperature rate of change in quality of the frozen product were the main purposes of this study. This is an interim report mainly concerned with the general aspects of the first objective.

From a practical and a laboratory standpoint, we need simple, rapid tests for both measuring and confirming quality differences in halibut of varying lengths of time out of water--tests that do not involve judgment or bias. Such tests must be both practical and useful to government and industry inspectors who are asked to spot check random lots of halibut. The tests are intended for application to a representative sample of a given lot rather than to each halibut unloaded. Also, the tests should involve new concepts and new approaches--with an eye to future needs.

In this report, I plan to discuss very briefly some highlights of our current work and to indicate, where possible, the potential practical aspects of this work. The discussion will be limited to the evaluation of the following four aspects of halibut^{1/} quality: (1) freshness, (2) raw-meat elasticity, (3) texture of the cooked meat, and (4) abnormal chalky condition.

To avoid any misunderstanding, I wish to emphasize that I am reporting preliminary tests that have not as yet been statistically evaluated. Hence, before any of these potential tests can be recommended for acceptance, they will require further study.

FRESHNESS

In evaluating freshness, I felt that it would be more practical to favor methods that are simple, rapid, and different in conceptual approach. Thus, some chemical and physical meth-

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^{1/}Talk delivered at Bureau of Commercial Fisheries Pacific Northwest Regional Conference on Fresh Dressed Halibut Quality and Standards on February 18, 1965, Seattle, Wash.

^{2/}The halibut in this study were caught off the Washington coast, about 20-40 miles southwest of Cape Flattery in 90 fathoms of water, with a locally chartered halibut vessel.

ods along with our usual sensory procedures were simultaneously used. Briefly and without detailed explanation, the following results are given--again with the understanding that further work is still needed.

CHEMICAL METHODS: The two chemical criteria employed--(1) hypoxanthine, a post-mortem breakdown product that develops from adenosine triphosphate (ATP, a compound involved in muscle action in the live fish), and (2) magnesium (also involved in ATP muscle action)--both change during the postmortem period with the degradation of cellular muscle tissue and biochemical constituents.

Hypoxanthine: The increase in hypoxanthine (by the method of Spinelli, Eklund, and Miyauchi 1964) in the halibut nape with increase of days in ice is shown in figure 1. At about the 19th day, our taste panel rejected the halibut because of off-flavor; this corresponds to about 0.28 mg. hypoxanthine per gram of meat. Hypoxanthine values below 0.15 therefore indicate a high level of freshness. Provisionally, we may consider Grade 1 halibut as having values below 0.21 and Grade 2, values between 0.21 and 0.27.

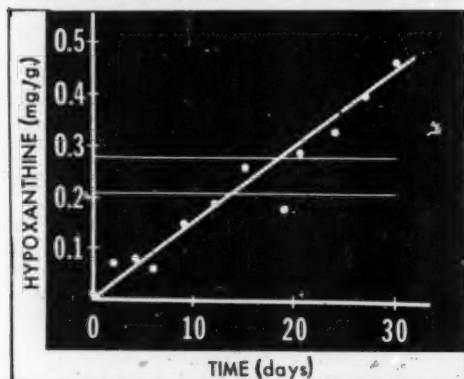


Fig. 1 - Variation in hypoxanthine content of halibut nape during iced storage.

Magnesium: The decrease of magnesium (by a modified method of Orange and Rhein 1951) in the free drip (24-hour drip at 33° F.) is shown in figure 2. At about the 19th day, our taste panel rejected the halibut because of off-flavor; this corresponds to 14-15 mg. percent magnesium. (We reject at a flavor score of 5 on a 0 to 10 sensory scale.) Magnesium values above 18 to 20 mg. percent indicate a high level of freshness.

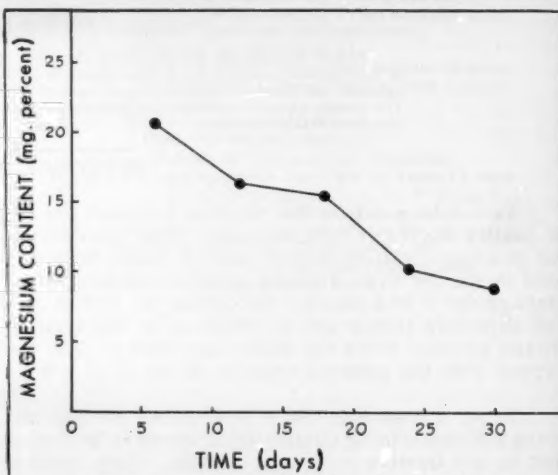


Fig. 2 - Magnesium content of the free drip of iced halibut (24-hour drip at 33° F., nape meat.)

These two chemical indices show initial promise but will have to be tested further on other series of halibut.

PHYSICAL METHODS: Physical methods, because of their inherent simplicity, offer the possibility for rapid examination of large numbers of samples. Two such methods were employed in this study: (1) pH difference between the skin surface and interior meat and (2) the electronic fish tester (Model V, developed in Germany).

pH difference: The pH measurements are made by setting the electrode in contact with the fish-skin surface and then with the interior meat. Values are read on the expanded scale of the pH meter after equilibration of the pH, usually within a couple of minutes. The pH difference between the skin surface and interior meat is a measure of the relative change in acidity due to bacteriological activity on the surface. Figure 3 shows little pH difference (about 0.2) until about the 10th or 12th day of iced storage, after which the rate of change in-

creases sharply. At about the 19th day, the halibut becomes unacceptable to a taste panel at which time we note a fivefold increase in the pH difference. Although evidence of panel rejection appeared on the 19th day, we still found some acceptable fish in the 24-day fish. The estimated possible quality range values could be: Grade 1 halibut below 0.6 and Grade 2 between 0.6 and 0.9.

Electronic Fish Tester: The electronic fish tester was tried with fair success at our laboratory on several species of bottomfish. The main advantages of this instrument are its simplicity of use, its portability, and its speed of operation. About 2 to 3 halibut per minute can readily be evaluated, making practical the field examination of a large number of samples.

PRINCIPLE OF TEST: After a fish dies, electrophysiological changes occur. This instrument is supposed to measure the difference in resistance of the cell membranes of a fish to two alternating currents (sent through electrodes applied to the fish surface)—one at a low frequency and one at a high frequency. The freshness is measured as follows: $Q = \frac{R_L - R_H}{R_H} 100$, where Q = freshness reading on instrument, and R_L and R_H

are the resistances at low and high frequencies, respectively. In a fresh fish (with the cell membranes intact), there is a large difference in resistance between the low and high frequencies, so instrument Q values are high. However, as the fish ages, the cell membranes of the fish begin to break down; they increase their permeability to charge-carrying ions, which reduce their resistance and capacitance, such that now the difference in resistance at the low and high frequencies decrease, and eventually disappear. Instrument Q values are low (Hennings 1963).

RESULTS WITH HALIBUT: In figure 4, we see that the instrument readings decrease very rapidly during the first 4 days of storage but decrease more gradually during subsequent storage, down to zero and below on some halibut.

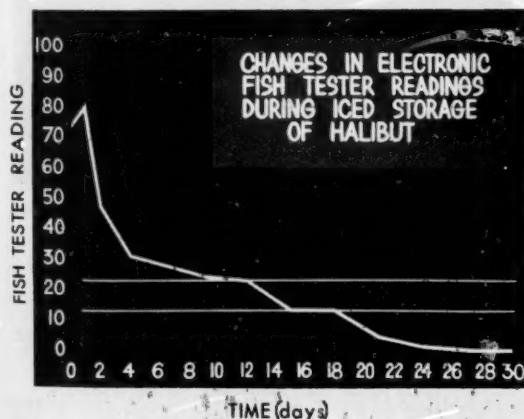


Fig. 4 - Variation in fish-tester readings during iced storage of halibut in a 38° F. chill room.

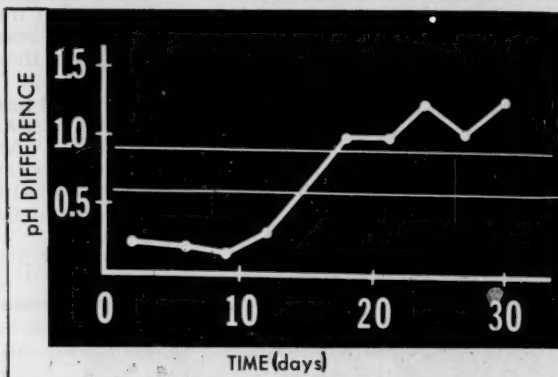


Fig. 3 - Difference in pH between halibut skin surface and interior meat at nape during iced storage in a 38° F. chill room.

Looking at figure 4, we might consider 0 to 4 days as being a rapid cellular breakdown phase, 4 to 12 days as being an equilibration phase for diffusion of cellular constituents and gradual bacterial buildup, and 12 to 24 days as being the period of accelerated microbial action (this agrees with the pH data in fig. 3) and further cellular breakdown. The halibut becomes unacceptable to the taste panel on about the 19th day, at a fish-tester reading of about 12. Fish-tester readings above 25 indicate a high level of freshness. Therefore, it would appear that values above a reading of about 20 could be considered for Grade 1, and between about 15 to 20 for Grade 2. Of course, more work will have to be done to confirm these limits on a statistical basis before they can be recommended to industry.

APPLICABILITY TO HALIBUT: Although the fish tester gives a fairly good estimate of the freshness or quality of a lot of fish, it will give abnormally low values for individual fish if: (a) the skin has been bruised or damaged at the point measured, (b) the fish has been partially or completely frozen, or (c) the fish has been subjected to excessive pressures or stresses. Since halibut is a rather large fish, the possibility of bruising and surface abrasion during normal handling presents a problem. However, if the sampling size is sufficiently large, which is practical since 2 to 3 halibut per minute can readily be evaluated, it appears that the bruising factor does not introduce serious variability in the instrument determinations of the halibut freshness on a lot basis. Also, in spite of the wide variability in halibut thickness, instrument readings appear to be independent of this factor within a given halibut. In summary, we can say that our data on halibut freshness looks promising enough to warrant further evaluation of this type of instrumental measurement on halibut.

ELASTICITY STUDIES

The relative subjective elasticity and softness of the raw meat of the landed fresh halibut is presently employed in dockside grading of halibut. We were therefore interested in its relation to textural quality of the cooked meat, initially and after frozen storage.

INSTRUMENTAL MEASUREMENT: The instrument we used to measure halibut softness or elasticity objectively is illustrated in figure 5. To estimate the elasticity subjectively, we press our finger into the halibut meat (fig. 5a) and then evaluate the rate and amount of recovery from the depression (fig. 5b) as a measure of the elasticity. To duplicate this action with the instrument, we apply a 1-pound weight to the fish surface through a round plastic knob for 10 seconds and read the total depth of depression on a dial; we then remove the weight, allow the depression to recover for 10 seconds, and read the depth of the remaining depression of the dial. The remaining depression after recovery, expressed as a percentage of the depression caused by the 1-pound weight, is the percentage residual deformation or percentage loss of elasticity.



Fig. 5 - Measuring the elasticity of halibut.



Fig. 5a - Pressing finger into halibut meat to estimate softness and elasticity.

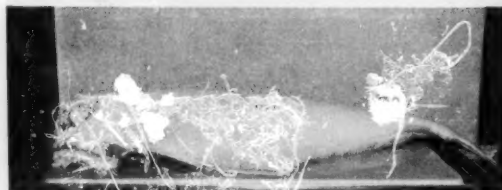


Fig. 5b - Showing residual deformation in soft halibut with poor elasticity.

RESULTS: In figure 6, the curve indicates the increasing percentage loss in elasticity (percentage residual deformation, fig. 5b) with days in ice. Now, if we cook samples from these halibut before we freeze the halibut or after 1 year of storage of the frozen halibut at -20° F. and evaluate the cooked texture with a taste panel or our hydraulic shear instrument (Dassow, McKee, and Nelson 1962), we find little, if any, noticeable difference.

Provisionally, we may say that soft halibut or halibut of poor elasticity do not necessarily result in poor cooked textural quality, either immediately after freezing or after 1 year of

storage at -20°F . (The effect of 0°F . storage on the rate of degradation in cooked texture is under study.) We should, however, point out that if our iced storage conditions are improved, we get a less steeply rising curve than that shown in figure 6--that is, we get a lower rate of loss of elasticity. Under these latter circumstances, although the texture characteristics do not show any real difference again, the product quality is increased from a freshness standpoint (sensory flavor evaluation).

TEXTURE STUDIES

We often find wide variability in cooked halibut texture within a given halibut and between halibut of similar origin. The wide variability of texture often observed cannot be directly related to days of iced storage. However, if we examine some of our data in terms of pH, we find an interesting correlation.

Figure 7 shows a comparison of the hydraulic shear or toughness of the frozen cooked halibut against the pH of the cooked drip for some 2- and 15-day iced halibut. (The hydraulic shear is obtained by cooking a frozen cylinder of halibut, placing the cooked plug between the set of jaws of the hydraulic shear instrument (Dassow, McKee, and Nelson 1962), and shearing to failure. The maximum hydraulic shear force represents the textural resistance or toughness of the halibut.)

Figure 7 also indicates that halibut of low pH are almost twice as tough as halibut of high pH, regardless of whether they are 2 days or 15 days old. We may conclude that the pH of the landed fish is of greater significance in determining the textural characteristics of the cooked product than the age of the landed halibut. The pH we know is related to the methods of catching and the degree of struggle of the halibut prior to death. This pH relation points to the importance of immediate stunning of halibut (last part of current vessel practice) in order to limit the degree of struggle.

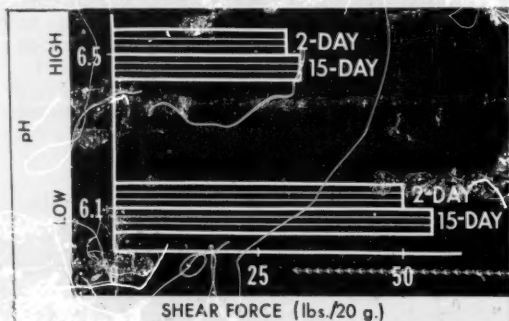


Fig. 7 - Comparison of hydraulic shear (toughness) of frozen cooked halibut against pH of the cooked drip for 2- and 15-day iced halibut after 1-year storage at -20°F .

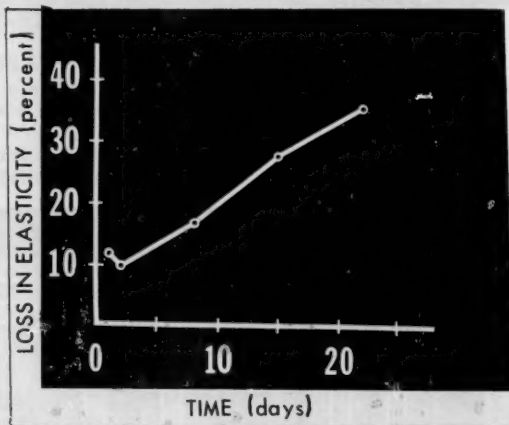


Fig. 6 - Loss of elasticity of halibut during iced storage in 40° to 60°F . chill room.

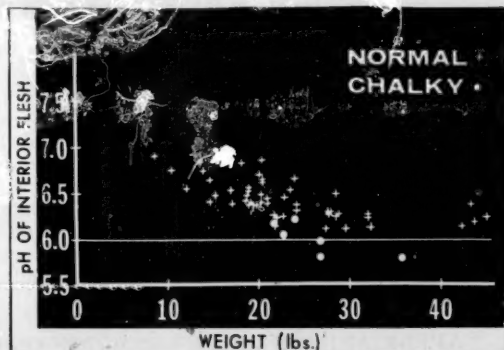


Fig. 8 - Variation of interior meat pH with weight of the halibut, head on and eviscerated.

At this point, I would like to present some data relating the pH of the interior meat to the size of the halibut. Figure 8 shows that the pH decreases with increasing weight of the halibut up to about 30 pounds and remains fairly constant above that weight. Of the six chalky halibut (discussion in next section) found in this experimental lot of halibut, the three severely chalky halibut were below pH 6.0, and the three slightly chalky halibut were above pH 6.0.

In evaluating the texture of these chalky halibut, we found that hydraulic shear (toughness) values were in about the 60-70 pounds force range, as we would expect from their low pH.

CHALKY CONDITION

The industry continues to be concerned about the chalky condition from both a quality and an economic standpoint. The precise cause and control of the condition is not completely known. The condition varies in degree from barely perceptible to excessive.

OBSERVATIONS: The condition is not immediately apparent but develops within at least 2 days after the halibut are caught. In normal halibut, the meat is semitranslucent; whereas

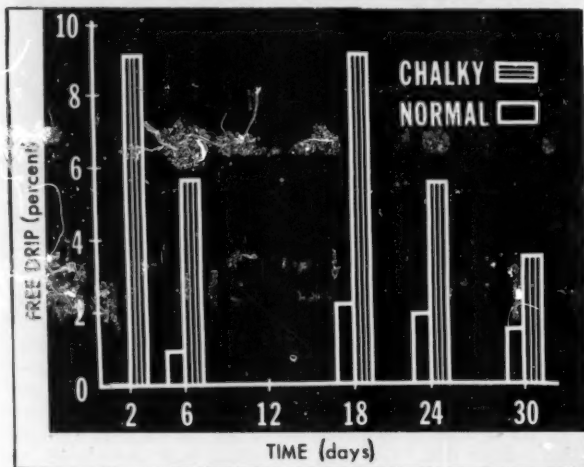


Fig. 9 - A comparison of the free drip from chalky and normal halibut during iced storage at 35° F. (Note: No measurable free drip was formed in the normal 2-day halibut.)

in chalky halibut, it takes on a flat-chalky-white opaque color. Other main abnormal characteristics of chalky halibut are its low pH and its great tendency to lose water (the water literally flows out of the tissue when it is cut). Its ready tendency to lose water is illustrated in figure 9 for the 2- to 30-day iced halibut.

In examining chalky halibut, we find a lower protein solubility (in high- and low-ionic-strength extractions) and a lower protein content in the free and cooked drip than are found in normal halibut. The cooked meat of chalky halibut becomes dry and tough but is otherwise acceptable. No identifiable parasites have been found associated with this condition.

EXPLANATION OF CHALKY CONDITION:

Based on our tests, on studies of meat products, and on studies in Canada at the Vancouver Technological Lab-

oratory (Tomlinson, Geiger, and Dollinger 1964), it appears that the predisposition to the chalky condition involves (1) feeding halibut that have high glycogen energy reserves in the muscle, (2) halibut that die in a frenzy of activity or are extremely exhausted, causing an accumulation of fatigue-produced lactic acid in the muscle, (3) halibut that are, for one reason or another, unable to get rid of the relatively high lactic acid accumulation, and (4) halibut held at a relatively high temperature--the higher the temperature of holding, the more rapidly the condition develops. The muscle proteins under these conditions appear to be sufficiently injured or altered to give rise to the readily apparent abnormality. This represents a preliminary working hypothesis subject to further test evaluation and modification.

APPLICABILITY OF INFORMATION ON CHALKY HALIBUT:

Provisionally, the following practice for minimizing the chalky condition may be recommended:

At Fishermen's Level: (1) Kill or stun halibut immediately to stop all physical activity. (Physical activity may increase the tendency toward chalky condition, and it may also lower the pH sufficiently to affect the texture of the meat adversely.) (2) Chill halibut immediately, as holding the fish at higher deck temperatures favors the earlier development of the chalky condition.

At Processors' Level: In flitching operations, avoid the use of halibut that may be potentially chalky as evident by trial examination of a meat cut or by pH measurement. Freeze these segregated halibut immediately and handle and use them only frozen. (Thawing for later use results in an intensification of the condition.)

SUMMARY

The principal aim of this study was to define the initial quality of fresh halibut when landed in subjective and objective terms. The need for simple rapid objective quality tests was simultaneously considered in the evaluation of the quality attributes: freshness, raw-fish elasticity, cooked texture, and abnormal chalky condition.

The chemical criteria for freshness (hypoxanthine content of meat and magnesium content of drip) and the physical criteria for freshness (difference in pH between surface and interior meat and surface measurement by electronic fish tester) all show promise but will require further testing. The use of the electronic fish tester appears to be the most practical because of its speed and operational simplicity.

The loss in elasticity of halibut during iced storage did not cause a related loss in cooked textural quality, immediately after freezing, or after 1-year of storage at -20°F .

The variability in cooked halibut texture was more directly related to the pH of the landed halibut than to the days of storage on ice--the lower the pH, the poorer the texture.

The main adverse characteristics of the abnormal chalky condition (white-opaque meat color) in halibut involved a lower than normal pH, poor water retentivity of the raw and cooked meat, and an associated poor texture. A preliminary hypothesis for this condition was set forth.

LITERATURE CITED

- BENDALL, J. R.
1963. Proceeding--Meat Tenderness Symposium, 1963 p. 41.
- DASSOW, JOHN A.; LYNNE G. McKEE; and R. W. NELSON
1962. Development of an Instrument for Evaluating Texture of Fishery Products. *Food Technology*, vol. 16, no. 3, pp. 108-110.
- HENNINGS, CHR.
1963. Ein neues elektronisches Schnellverfahren zur Ermittlung der Frische von Seefischen (A Rapid New Electronic Process for Determining the Freshness of Salt-Water Fish). *Zeitschrift für Lebensmittel-Untersuchung und Forschung*: 119. Band, 6. Heft, Seiten 461-477.
- ORANGE, M., and H. C. RHEIN
1951. Microestimation of Magnesium in Body Fluids. *Journal of Biological Chemistry*, no. 189, pp. 379-386.
- SPINELLI, J.; M. EKLUND; and D. MIYAUCHI
1964. Measurement of Hypoxanthine in Fish as a Method of Assessing Freshness. *Journal of Food Science*, vol. 29, no. 6, pp. 710-714.
- COMLINSON, N.; S. E. GEIGER; and E. DOLLINGER
1964. Chalky Halibut. Fisheries Research Board of Canada, Technological Research Laboratory Circular No. 33, pp. 1-8.

Note: Acknowledgment: R. Nelson (Chemical Engineer, U. S. Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash.) procured the halibut used in this study. R. Nelson and Harold Barnett (Chemist, Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash.) obtained the electronic-fish-tester and hypoxanthine data.



Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

WADE SEINE CONSTRUCTION AND METHOD OF USE

By Hilton M. Floyd*

The wade seine is one of the many and varied types of haul seines used in the fishing industry. Since the fishermen have to wade into the water with this seine, it is used mostly in warm climates. The seine described in this paper is popular along the southeastern coast of the United States, especially in northeastern Florida. Species caught on the Florida coast with the wade seine include mullet (Mugil sp.), spotted or speckled sea trout (Cynoscion nebulosus), king whiting or kingfish (Menticirrhus americanus), white sea trout or weakfish (Cynoscion arenarius), fluke or summer flounder (Paralichthys lethostigma), bluefish (Pomatomus saltatrix), and gafftopsail catfish (Bagre marinus).

The wade seine is one of the easiest seines to construct because it has no tapered netting. Actually it is just a rectangular piece of netting with a floatline, a leadline, and a pole attached to each end for convenience in hauling.

Purchasing a ready-made seine usually saves valuable time; however, some commercial fishermen might save money by building this gear themselves.

This paper will first describe the gear and then tell how it is used.

CONSTRUCTION

Species to be caught and laws governing mesh size and net dimensions are many and varied, so it would be impracticable to describe a "universal" seine--one suitable for all areas of the world. However, a 180-foot-long, $2\frac{1}{2}$ -inch stretched mesh seine has proven successful along the southeastern coast of the United States and will be used as the example in this paper.

Synthetic materials are recommended because they are strong and lasting. Materials needed to construct a wade seine can be obtained at most supply houses serving commercial fishermen. Materials needed:

1. Netting--double selvage, 1,440 meshes long (300 feet stretched) and 50 meshes deep. Mesh size-- $2\frac{1}{2}$ inches (stretch measure) of No. 208 nylon twine. No. 208 twine is about 0.0224 of an inch in diameter.
2. Floatline and breastlines-- $\frac{1}{4}$ -inch diameter hard-laid nylon rope, 207 feet long.
3. Leadline-- $\frac{5}{16}$ -inch diameter braided leadcore rope (50 pounds per 600 feet), 193 feet long.
4. Net floats (60)-- $2\frac{1}{2}$ inches diameter by $1\frac{1}{2}$ inch thick by $\frac{1}{2}$ -inch hole, made of synthetic or cork material.
5. Hanging-in twine--No. 9 spun nylon, 1 pound. No. 9 twine is about 0.0354 of an inch in diameter.
6. Wood shafts (2)--6 feet long by 2 inches diameter, hickory or equal.
7. Net needle--1 medium size.

Even the amateur fisherman should have no difficulty in constructing a wade seine if he adheres to the following instructions and illustrations.

* Fishery Methods and Equipment Specialist, Exploratory Fishing and Gear Research Base, U. S. Bureau of Commercial Fisheries, Pascagoula, Miss.

Cut two 7-foot pieces from the end of the $\frac{1}{4}$ -inch nylon rope for breastlines (vertical lines at ends of net) and set aside. Make sure there are no kinks in the floatline or leadline. String all the floats onto the $\frac{1}{4}$ -inch nylon floatline. Tie one end of both the floatline and leadline to a post or other convenient support at waist level and about 2 inches apart. Secure the opposite ends in this position. Be careful not to stretch one line tighter than the other. If there is not enough room to stretch the lines their entire length, stretch out as much as possible. Now you are ready to start hanging the netting to the lines.

This is where you use the net needle (Knake 1947), a simple tool for storing the twine while the hanging-in is being done. The needle is pointed on one end so that it can be easily passed through the meshes. Near the pointed end is the tongue and at the opposite end is the fork. To fill the needle, take several turns around the base of the tongue with the end of the hanging twine (No. 9 spun nylon), and then wind the twine down the side, around the fork, up the opposite side, around the tongue and back to the other side. Continue winding tightly until the needle is full.

There are different opinions on how slack to hang the netting in a wade seine. Experience has shown that 60 percent of the stretched measurement of the netting gives favorable results. Since the seine described in this paper is of $2\frac{1}{2}$ -inch stretched mesh, 3 meshes will be hung on $4\frac{1}{2}$ -inch ties.

The hanging twine is secured to the floatline and leadline by a clove hitch.

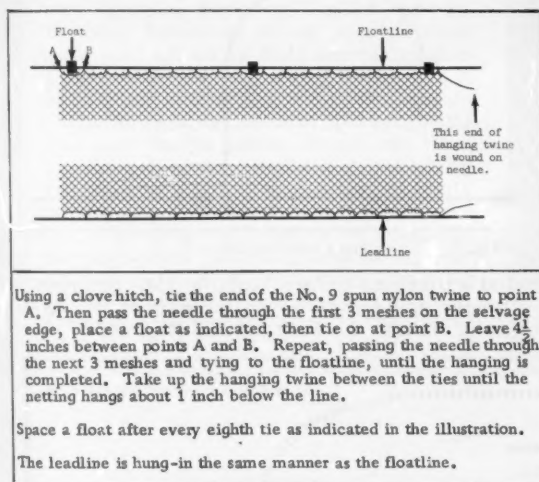


Fig. 1 - Hanging-in guide.

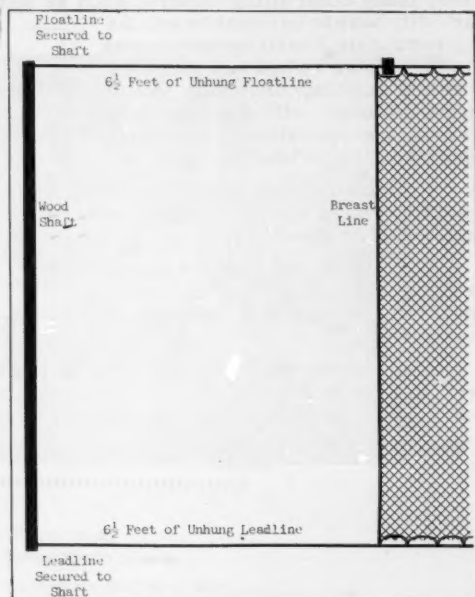


Fig. 2 - End of wade seine.

Using a piece of chalk or other marking device, mark the horizontally stretched floatline at $4\frac{1}{2}$ -inch intervals, beginning $6\frac{1}{2}$ feet from the end.

Use figure 1 as a guide for hanging-in the netting.

The hanging ties on the leadline are made opposite the hanging ties on the floatline. When the hanging-in is completed each line will have exactly the same number of hanging ties.

Next, weave the 7-foot lengths of $\frac{1}{4}$ -inch nylon rope, cut previously through all the meshes at each end of the netting, and use a clove hitch to secure the ends to the floatline and leadline. Lash in place with No. 9 spun nylon.

Use figure 2 as a guide for rigging the ends of the seine.

Make sure you have exactly $6\frac{1}{2}$ feet of unhung floatline and leadline on each end of the seine.

Next, secure the floatline to one end of a wood shaft and the leadline to the other end. Do this on each end of the seine. Use an equal amount of line on both ends in securing them to the shafts. This job completes the wade seine.

Leadcore rope is a relatively new product and certainly lessens the labor in wade seine construction. However, if leadcore rope is not available and individual leads are to be used, use 2-ounce seine leads, spaced at $1\frac{1}{2}$ -foot intervals, on $\frac{1}{4}$ -inch-diameter nylon rope.

A stretcher-type tray is an ideal seine container. This is easily constructed by centering and securing a 3-foot by 5-foot piece of canvas between two $6\frac{1}{2}$ -foot wood shafts.

Always wash and dry the seine thoroughly after each use. A netting preservative compound that is not harmful to synthetic materials is recommended to lessen abrasion.

METHODS

The object of wade seining is to surround the fish and haul them onto the beach. However, many controlling factors, such as water current, type of bottom, movement of fish, and turbidity have to be considered. As a general rule, the fisherman knows the area to be fished and can cope with the existing conditions. Some rules, however, will apply to most wade seine operations, among which are the following:

1. Schooled fish should be surrounded from a direction opposite to that of their travel (fig. 3).

2. If scattered fish are known to move with an existing current, and it is not too strong, haul against the current.

3. In instances where the seine is to be hauled a distance before landing, i.e., dragged over an area to accumulate scattered fish, the offshore end should be well ahead of the inshore end, and there should always be a bight of line behind the inshore end (fig. 4).

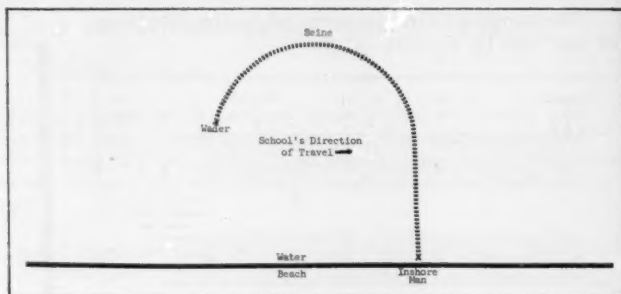


Fig. 3 - Surrounding a school of fish.

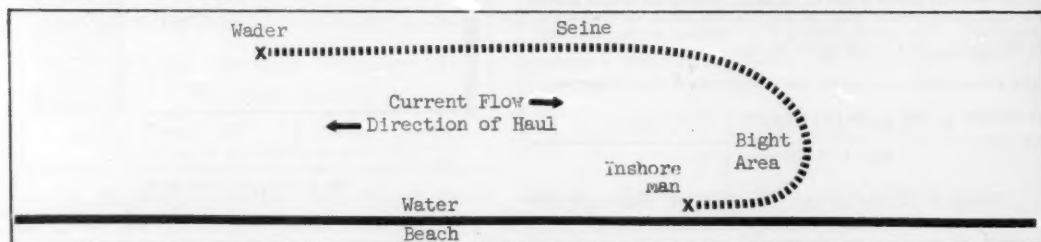


Fig. 4 - Hauling for scattered fish.

4. The inshore man should watch the bight for breaking or jumping fish and signal the wader when it is time to land the catch.

5. Never wade so deep that the net does not touch the bottom. Lack of bottom traction slows the movement of the seine and allows escapement around the offshore end.

6. While landing the net, keep the leadline as close to the bottom as possible, so it will not allow the fish to swim under and escape. Also, if the fish are jumping, holding the floatline up above the water surface will greatly reduce escapement.

7. Always keep noise to a minimum because it will scare the fish offshore. Likewise, lights shown on the water at night may frighten the fish.

Commercial wade seining on the northeast Florida coast is usually carried out by two men, the inshore man (who normally directs the operation) and the wader.

REFERENCES

KNAKE, BORIS O.

1947. Methods of Net Mending--New England. U. S. Fish and Wildlife Service, Fishery Leaflet 241, 17 pp.

SIEBENALER, J. B.

1955. Commercial Fishing Gear and Fishing Methods in Florida. State of Florida Board of Conservation, Technical Series No. 13, 47 pp.



SHRIMPETTI

Americans have enjoyed macaroni since Revolutionary days, but spaghetti was unknown here until much later. Thomas Jefferson spent considerable time and effort in Italy searching for a spaghetti-making machine. But it wasn't until the 1920s, when Italian restaurants became popular, that spaghetti was used in the home. From that time on, the public developed a great liking for spaghetti, and the making of pasta became an important American industry. Now it is said that more spaghetti is sold in New York City than in any other city in the world! Shrimp and spaghetti, a favorite combination in Italy, have become very popular in the United States. Shrimpetti, featured in many restaurants during Lent, will add sparkle to your home cooking.



SHRIMPETTI

1 tablespoon salt
3 quarts boiling water
8 ounces spaghetti
2 tablespoons butter or margarine
 $\frac{1}{3}$ cup olive oil
1 medium onion, sliced
1 clove garlic, minced
1 $10\frac{1}{2}$ -ounce can condensed tomato soup

$\frac{1}{2}$ cup water
1 tablespoon chopped parsley
1 pound shelled, deveined fresh shrimp,
or 1 (8 or 10 ounce) package frozen shrimp,
shelled and deveined
Salt to taste
Grated Parmesan or Romano cheese

Add 1 tablespoon salt to rapidly boiling water. Gradually add spaghetti so that water continues to boil. Cook, stirring occasionally, until tender. Drain. Meanwhile, melt butter or margarine. Add oil and heat 1 minute. Add onion and garlic and cook over low heat until onion is tender but not browned. Stir in tomato soup, water and parsley; cook over very low heat 10 minutes. Add shrimp and simmer about 5 minutes. Add salt to taste. Spoon over spaghetti. Serve with grated Parmesan cheese. Makes 4 servings. (J. Walter Thompson Co., New York City.)

TRENDS AND DEVELOPMENTS

TECHNICAL NOTE NO. 2--AN INEXPENSIVE SCALLOP CLEANER BUILT FROM SPARE PARTS

By Austin B. Williams*

A vacuum cleaner modified for cleaning scallop meats, and proven workable in pilot operation, produces clean meats at a rate comparable to that attained by manual shucking. Aside from an industrial machine in which heat is used for freeing the adductor muscle preparatory to vacuum cleaning (Bullis and Love 1961), little has been accomplished in mechanizing the scallop-shucking industry.

As with many of our seafood-processing operations in the Carolinas, shucking of bay and calico scallops requires much hand labor at a low rate of pay. Conditions under which the scallops are opened require that the meats be washed after shucking to remove sand, seaweed, undesired scallop tissue, etc. Often this results in an excessively soaked, inferior product. The machine-cleaning method described here eliminates the need for washing and thus assures a higher quality product. It also eliminates some of the labor from shucking.

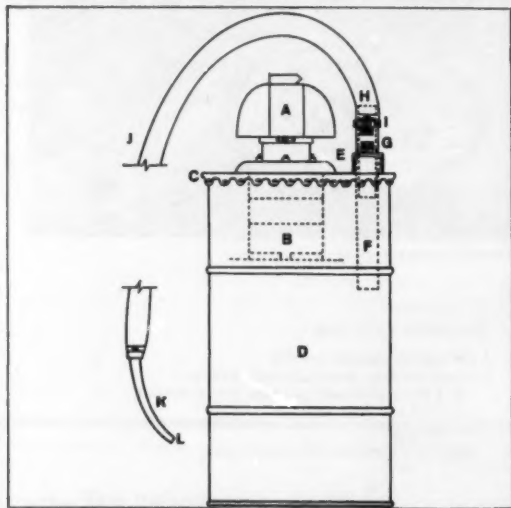


Fig. 1 - Side view of vacuum cleaner modified for cleaning scallop meats. (See text for explanation of labeled parts.)

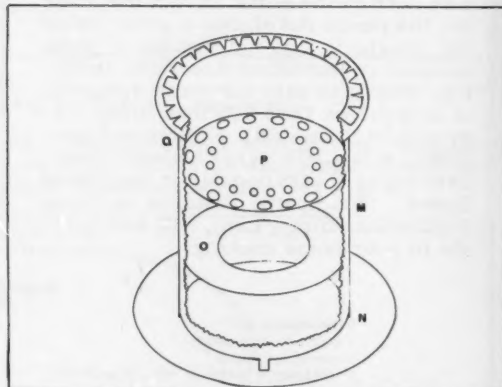


Fig. 2 - Enlarged cutaway view of baffle (part B) in fig. 1 made entirely of galvanized sheet metal: cylindrical portion (M) 6 inches in diameter by $6\frac{1}{2}$ inches deep, bottom deflector (N) separated from M by $\frac{1}{2}$ -inch space, lower internal plate (O) with $1\frac{1}{2}$ -inch center hole, upper internal plate (P) with row of $\frac{1}{2}$ - and $\frac{3}{8}$ -inch holes near circumference, relieved flange and ring (Q) for fastening to barrel lid.

*Associate Professor of Zoology, Institute of Fisheries Research, University of North Carolina, Morehead City, N. C. (R. A. David helped with development and assembly of this machine. Glenn P. Lewis made the drawings.)

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 751

An inexpensive scallop cleaner made from commonly available spare parts was assembled and tried in a laboratory and in shucking houses. The machine (figs. 1 and 2) is simply a modification of the "shop-type" vacuum cleaner in which a barrel is substituted for the often non-waterproof dust tank, and the motor is protected from moisture. A motor and fan housing (A) from an old, home tank-type vacuum cleaner and a sheet-metal baffle (B) are bolted to a hole cut off in the center of the lid (C) of a 125-lb.-capacity grease barrel (D) in such a way that the motor and fan housing are outside of the lid, and the baffle over the suction end of the fan housing is inside the barrel when the lid is in place. A second hole cut near the opposite side of the lid, and fitted with a $1\frac{1}{2}$ -inch brass-pipe coupling (E) soldered in place, is the suction inlet to the barrel. Screwed into this coupling is a 10-inch section of $1\frac{1}{2}$ -inch pipe (F) extending below the lower level of the baffle, and a 3-inch-long nipple (G) extending upward. A $1\frac{1}{2}$ -inch chromium-plated brass automobile tailpiece pipe (H) placed inside the nipple and coupling is held in place with a slip nut (I). A $4\frac{1}{2}$ -foot length of heavy $1\frac{1}{2}$ -inch rubber gasoline hose (J) is clamped to the tailpiece, and to the hose's outer end is clamped the metal, swiveled, suction nozzle (K) originally on the vacuum cleaner hose. The sharp edge of this nozzle is blunted, to prevent cutting the meats, by inserting a short length of 1-inch I. D. copper tubing (L) soldered at the terminal edge to the vacuum nozzle. Flexibility, which allows the nozzle to be positioned conveniently for the individual operator, comes from three sources: (1) the hose; (2) the tailpiece pipe which acts as a swivel; (3) the built-in swivel in the vacuum cleaner nozzle. Suction holds the lid in place.

Total cost of parts for this machine was less than \$5.00 exclusive of motor. The round holes in the drum lid were cut by a tinsmith, but the remainder was fabricated in a home workshop.

Shuckers of bay scallops, using the conventional method, have been timed at 10-14 scallops per minute. No special effort was made to find the fastest shucker. Many do not work that fast. The women timed were asked to use the scallop cleaner, and with very little practice opened and cleaned scallops at a rate comparable to that of their accustomed method. Practice would speed the process, which consists essentially of the following steps: (1) pick up scallop; (2) remove top valve of shell with knife; (3) present all tissue cupped in lower valve to suction nozzle; (4) suction removes all tissue and debris except the adductor muscle, leaving the meat in the shell, clean and ready to be removed; (5) clip cleaned adductor muscle into meat receptacle with knife, and discard empty lower valve of shell. In this sequence it is assumed that the suction nozzle is fixed in a convenient position. It is thought that improved and larger models with valved, multiple suction nozzles could be placed in commercial use at nominal cost.

Offal, presently discarded, is trapped in the barrel for easy transferral to a dehydrator. Bullis and Love (1961) assayed this material.

The hose and nozzle can be cleaned of slime by sucking a bucketful of water into the machine. The arrangement of parts keeps the baffle dry at all times; the latter is chiefly a safeguard for the nonwaterproof motor.

The most important features of this machine are: (1) initial low cost for family enterprises; (2) cleaner, unsoaked meats; (3) a somewhat more rapid method of opening than traditional methods; (4) recovery of offal for dehydration.

LITERATURE CITED

BULLIS, HARVEY R., JR., and TRAVIS D. LOVE

1961. Applications of steaming and vacuum to shucking and cleaning scallops. Commercial Fisheries Review, vol. 23, no. 5 (May), pp. 1-4. (Also Sep. No. 618.)



Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, OCTOBER 1965:

U. S. S. R.: The major Soviet trawling effort in the Gulf of Alaska during the first half of October 1965, consisting of about 69 trawlers, 16 reefers, and a few support ships, operated exclusively off Dixon Entrance. After mid-month that fleet decreased to about 49 trawlers and 12 reefers, moving up the coast of southeast Alaska to Cape Ommaney. There was no Soviet activity in other areas of the Gulf until mid-October when two BMRT's appeared on Albatross Bank south of Kodiak Island. By the end of the month the Soviet fleet on Albatross Bank had increased to at least 7 BMRT factory stern trawlers.



Fig. 1 - Soviet research trawler.

In the central Aleutians a Soviet fleet of 12 trawlers and 3 reefers operated until about October 15 in the general area south of Segum Pass. During the last half of the month, that fleet was dispersed along the south side of the Aleutians, working as far westward as Amchitka Pass.



Fig. 2 - Soviet factoryship.

The Soviet ocean perch fleet in the western Aleutians operated throughout October in the vicinity of Attu Island. That fleet decreased to about 10 trawlers and occasional support ships during the month.

A total of 7 Soviet SRT-M side trawlers reappeared on the shrimp grounds east of the



Fig. 3 - Soviet SRT side trawler.

Shumagin Islands in late October. It was the first Soviet shrimp fishing activity observed in the area since mid-September.



Fig. 4 - Soviet tanker used to service fishing vessels.

Two Soviet whaling fleets operated south of the central and western Aleutians during October. The third whaling fleet had presumably departed waters off the Alaska coast.

Japan: A Japanese trawling fleet made up of 5 factory stern trawlers fished for Pacific ocean perch in the Gulf of Alaska between Portlock Bank and Albatross Bank during October. One of the trawlers left the area by the end of the month.



Fig. 5 - Japanese stern-ramp trawler.

One Japanese large stern trawler fished in the central Aleutians during the early part of the month, at which time she either moved beyond the Alaska region covered by patrols

or returned to Japan. Three stern trawlers fished Pacific ocean perch in the vicinity of Buldir Island in the western Aleutians, with one of the trawlers departing at the end of the month.



Fig. 6 - Catch aboard a Japanese trawler.

Two Japanese whaling fleets, consisting of 2 factoryships, 14 whale killers, and 2 reefers, which had been operating in the western Aleutians since about mid-August, left that area the first week of October. Those fleets were believed had returned to Japan.

The only Japanese shrimp fishing fleet (a factoryship and 8 trawlers) remaining in the Alaska region moved during the first week of October from the known shrimp grounds near the Pribilof Islands to off the Siberian coast. The following week that fleet returned to Alaska in the vicinity of Amchitka Pass and remained there for about a week when she left the area, presumably for Japan.

Two Japanese long-line vessels, one fishing off Middleton Island and one on Albatross Bank between Trinity and Chirikof Islands, ended operations in October, while a new vessel appeared off southeast Alaska.

JAPANESE CATCHES ON ALBATROSS BANK EXCELLENT:

A staff member of the U. S. Bureau of Commercial Fisheries spent a month during fall 1965 aboard the Japanese stern-ramp trawler Tokachi Maru. He witnessed 47 hauls for Pacific ocean perch in the Albatross Bank vicinity. Pacific ocean perch catches during that time accounted for 93 percent of the total catch tonnage. Sablefish,

blackthroat rockfish, pollock, and arrowtooth flounder made up the remainder of the catch. Even though sea conditions and weather were poor during the period (15-20 knot winds and swells of 15 to 20 feet nearly continuously), the Tokachi Maru had excellent fishing, with average catches per hour totaling over 12 metric tons. The vessels Tokachi Maru and Takachiho Maru were scheduled to fish until December, but the Daishin Maru No. 12 was reported en route to Japan. The vessels Taiyo Maru No. 82, Akebono Maru No. 53, and Koyo Maru, a new vessel, were expected to winter trawl in the Gulf of Alaska.

LARGER SHRIMP PROCESSED AT HOMER PLANT:

A new plant in Homer started processing larger sizes of Alaska shrimp. About 1,500 to 2,000 pounds of 40-60 count heads-off shrimp were delivered each day during October. The shrimp are cleaned, sorted, and packed in 3 or 5-pound cartons for sale fresh or frozen for the institutional market. The company is also processing king and Dungeness crab.

PROCESSING PLANT FOR BOTTOMFISH PLANNED AT KODIAK:

One of the major fish packers in Alaska has been interested in acquiring the middle section of the present city dock in Kodiak to establish a processing plant for bottomfish, scallops, and shrimp. Tentative plans are to produce both block frozen and packaged fillet products. Markets are said to have been established for the plant if it goes into production.

NEW KING CRAB-PROCESSING PLANT AT KODIAK:

A new king crab-processing plant (a converted liberty ship) in Kodiak began processing king crab in late September 1965. The new plant adds 100 new cannery jobs and provides a market for a sizable fleet of fishing vessels.



Alaska Fisheries Investigations

SCULPIN FEED HEAVILY ON PINK SALMON EGGS:

The movements and feeding of sculpin (*Cottus aleoticus*) were studied by the U. S. Bureau of Commercial Fisheries during summer and fall 1965 at Little Port Walter in Sashin Creek. This sculpin is found in great abundance in pink salmon streams at these latitudes. Over 2,700 sculpin were marked by fin removal and branding. Subsequent recoveries showed that the sculpin exhibited little movement until pink salmon spawning began after mid-August. By mid-September, much of the sculpin population had concentrated in the upper area of the Sashin Creek spawning ground. They fed mostly on pink salmon eggs after mid-August. Observations were being continued, and the number of pink salmon eggs removed from Sashin Creek were being computed.



American Fisheries Advisory Committee

RECOMMENDATIONS AT MEETING IN CALIFORNIA:

At a 4-day meeting in San Pedro, Calif., October 25-28, 1965, the American Fisheries Advisory Committee recommended that the United States continue its efforts for international cooperation in conserving the yellowfin tuna stocks of the tropical Pacific Ocean. Participation by all nations fishing for yellowfin tuna on a substantial basis should be sought so that perpetuation of the resource can be assured, the Committee said.

The Committee also recommended: (1) an expanded oceanographic research program upon which to base wise management of the fisheries resources which are vital to the economic well-being of the United States fishermen; (2) further development and promotion of presently underutilized species to enhance the economic status of the industry; (3) further development of a fishery marketing program recognizing the capabilities and responsibilities of both industry and government; and (4) greater industry support of legislation favorable to the conservation of fisheries resources for the benefit of all Americans.

The Committee pointed out that there is a continuing need for training commercial fishermen and engineers and that greater efforts are required to protect the inshore coastal waters from the hazards of pesticides and pollution.

Discussions at the meeting included harvesting and utilization studies by the Bureau on Pacific Ocean hake, and progress made in State-Federal cooperative research and development programs under Public Law 88-309 (also known as the Commercial Fisheries Research and Development Act of 1964).

The Committee was established in 1955 under the Saltonstall-Kennedy Act to advise the Secretary of the Interior on fisheries matters. Dr. Stanley A. Cain, Assistant Secretary of the Interior for Fish and Wildlife and Parks is the Committee's chairman.

Note: See Commercial Fisheries Review, July 1965 p. 18.



American Samoa

TUNA FISHING FLEET:

During September 1965 a total of 96 foreign tuna fishing vessels were fishing out of American Samoa. They consisted of 58 Japanese, 27 South Korean, and 11 Formosan vessels. (Suisancho Nippo, October 29, 1965.)



California

ALBACORE TUNA MIGRATION STUDIES:

M/V "N. B. Scofield" Cruise 65-S-3-Albacre (May 25-June 23, 1965): To intercept schools of albacore tuna and determine their migration route into the mainland fishing grounds was the primary objective of this cruise by the California Department of Fish and Game research vessel N. B. Scofield. The cruise area ranged 700 miles offshore, between the latitudes of Guadalupe Island and Monterey, Calif. The vessel was unsuccessful in catching any albacore while trolling 7 jig lines over 2,500 nautical miles.

Another objective of the cruise was to collect oceanographic meteorological, and biological data which may be related to albacore occurrence.

Sea surface temperatures were obtained by bucket thermometer and by a thermograph which was operated continuously during the cruise. Temperatures ranged from 56.1° F. outside southern California's Channel Islands to 64.4° F. at the survey's southwestern margin.

A total of 78 bathythermograph (BT) casts was made at approximately 40-mile intervals. The BT slides were read, coded, and forwarded to the National Oceanographic Data Center in Washington, D. C., via the U. S. Bureau of Commercial Fisheries Radio Station WWD. A Nansen-bottle cast at each BT station provided temperatures at a depth of 10 meters (32.8 feet), and water samples for use in salinity determinations. Standard weather observations were made every 6 hours.

Specimens of marine life were collected at night-light stations while the vessel was on sea anchor. One pomfret (*Brama japonica*) and 330 large jack mackerel (*Trachurus symmetricus*) were caught at night with a rod and reel. Pacific sauries (*Cololabis saira*) and lanternfish (*Myctophidae*) were observed at every station worked. Saury were the most plentiful species, ranging from a few fish to schools of several hundred. Four blue sharks (*Prionace glauca*) were tagged and released for the U. S. Bureau of Commercial Fisheries. The most common invertebrates attracted to the nightlight were pteropods, cephalopods, heteropods, coelenterates, and tunicates.

Birds identified during the cruise were the black footed albatross, petrels, Xantus's murrelet, redbilled tropic bird, and a Laysan albatross.

Nothing was caught in one midwater trawl tow, and sea conditions prevented further tows.

Note: See Commercial Fisheries Review, November 1964 p. 23.

CALIFORNIA HALIBUT TAGGING AND RELATED STUDIES:

M/V "N. B. Scofield" Cruise 65-S-4-California Halibut (August 3-19, 1965): To tag legal-sized California halibut and collect supplemental age and growth information from selected halibut was the objective of this cruise by the California Department of Fish and Game research vessel N. B. Scofield. The Ventura Flats, Channel Islands, and Santa

Barbara area comprised the general area of investigations.

During the cruise, age and growth data were taken from 27 large halibut ranging up to 36 pounds. Nineteen of those fish were large males, rarely seen in previous samples. Attempts to obtain samples of 0- and 1-ring halibut at Ventura Flats, Santa Rosa Island, Santa Cruz Island, and Goleta were unsuccessful. In all, 632 California halibut were measured, tagged, and released.

A tagged halibut released in March 1965 from the research vessel Alaska was recaptured, measured, and released. In the 162 days that fish was at liberty, it traveled 37 miles and suffered a growth loss of 0.3 inch, probably from handling and tagging shock.

A number of flatfish (*Xystreurys liolepis*, *Parophrys vetulus*, and *Pleuronichthys verticalis*) caught on the cruise were donated for research with animal chromosomes.

ROCKFISH SPECIES COLLECTED FOR BIOLOGICAL STUDIES:

M/V "N. B. Scofield" Cruise 65-S-5-Rockfish (August 30-September 16, 1965): To obtain species of rockfish (family Scorpaenidae) for biological studies was the principal objective of this cruise in the vicinity of the southern California islands and offshore banks by the research vessel N. B. Scofield of the California Department of Fish and Game.

To save eye lenses from certain species for comparison of their proteins as a possible means of separating non-interbreeding populations was another objective. These were taken from a number of rockfish species and frozen for appraisal at the California State Fisheries Biological Laboratory.

During the cruise, hook-and-line fishing was conducted in depths from 10 to 275 fathoms, but mostly shallower than 150 fathoms because of faulty wire on the deep-sea reels. Of the 33 species of rockfish caught, the vermilion rockfish (*Sebastes miniatus*) were predominant and were taken in all general areas fished. Nearly as common were the green-spotted (*S. chlorostictus*) and pink rockfish (*S. eos*), followed by rosy (*S. rosaceus*), starry (*S. constellatus*), bocaccio (*S. paucispinis*), chilipepper (*S. goodei*), and speckled

rockfish (*S. ovalis*). The largest rockfish caught was a 22-pound cow (*S. levis*), a species that appears to favor bank habitats rather than areas adjacent to land masses.

A number of rockfish were frozen for taxonomic studies. Examination of freshly caught specimens during the cruise indicated that the species *S. rufus*, previously considered a synonym of *S. ovalis*, is a separate species.

Other than rockfish, the most commonly caught fish of the cruise was the Pacific sanddab (*Citharichthys sordidus*). Ocean whitefish (*Caulolatilus princeps*) and sheephead (*Pimelometopon pulchrum*) also were common. Blue sharks (*Prionace glauca*) were a nuisance in some of the areas fished.

Surface sea water temperatures taken varied from 61° to 69° F., but 65° F. water was the usual thing.

FALL 1965 PELAGIC FISH POPULATION SURVEY:

M/V "Alaska" Cruise 65-A-6-Pelagic Fish (July 22-August 6, 1965): The objectives of this cruise by the California Department of Fish and Game research vessel *Alaska* in the coastal waters of southern Baja California from Magdalena Bay to Punta Eugenia were to: (1) survey the fish and invertebrates of the inshore pelagic environment; (2) assess the distribution, abundance, density, age and size distribution, and recruitment of pelagic fish populations; (3) obtain samples for blood genetic studies by the U. S. Bureau of Commercial Fisheries; (4) bring back 1965 year-class sardines for growth studies by the U.S. Bureau of Commercial Fisheries; (5) collect eye lenses of important sport and commercial fish species for racial studies; and (6) collect sharks and rays for the Los Angeles County Museum.

This was the first of 5 cruises scheduled for fall 1965 to survey the coast between Magdalena Bay, Baja California, and San Francisco. Midwater trawl and night-light stations, and scouting at night between stations comprised the survey. Since this year's (1965) survey was shorter than usual, no special efforts were made to obtain young sardines alive, midwater trawl coverage was somewhat less intensive, and light stations were more numerous in the southern part of the survey area.

A total of 28 night-light/blanket-net stations was occupied during the cruise--16 in the Magdalena Bay area, 5 around Punta Abreojos, 5 near Punta Asuncion, and 2 near Turtle Bay. There were 22 midwater trawl tows made--4 in or near Magdalena Bay, 7 between Cabo San Lazaro and Punta Abreojos, and 11 between Punta Abreojos and Punta Eugenia. A total of 86 miles was scouted while running between light stations at night.

PACIFIC SARDINES: Sardines (*Sardinops caeruleus*) were taken in 5 midwater trawl tows and at 4 night-light stations. Six of the 9 catches were made in the Magdalena Bay-Santa Maria Bay area and 1 each near Punta San Juanico, Punta Abreojos, and Punta Eugenia. One sample from Magdalena Bay, 2 from Santa Maria Bay, and 1 from Punta Abreojos were fish-of-the-year, with most fish ranging from 100 to 130 millimeters (3.9 to 5.12 inches) long. The remaining 3 samples from the Magdalena Bay area and the sample from Punta San Juanico were subadults, with most between 130 and 170 millimeters (5.12-6.69 in.) in length. Only one sample of adults was taken; those were caught just south of Punta Eugenia and were mostly between 180 and 210 millimeters (7.09-8.3 in.) long.

Sardines were about as abundant as the previous year in the Magdalena Bay area, and young fish in almost pure schools made up a large part of the catch for the second straight year. Catches north of Punta Abreojos were poorer than in the previous 2 years, being comparable to the poor catches made in 1962.

NORTHERN ANCHOVIES: Anchovies (*Engraulis mordax*) were taken in 15 trawl tows and at 1 light station. As has been the pattern in recent years, anchovies were taken at most stations and in the largest quantities. Also fitting the pattern were the far greater number of anchovy samples taken with the midwater trawl and the small quantities in many trawl catches (7 of the 15 trawl catches yielded less than 5 pounds).

A total of 13 anchovy catches were made north of Punta San Juanico. The best catches were made between Punta Abreojos and Punta Asuncion, where 3 tows made over a 20-mile stretch yielded about 1 ton of fish each. The only successful light station was in Magdalena Bay, where a little school of small fish (39-65 millimeters or 1.5 to 2.6 inches long) was attracted to the light.

The samples caught below Punta Abreojos consisted mostly of young fish ranging up to 90 millimeters (3.5 in.) long. The anchovies taken north of Punta Abreojos were somewhat larger, with most ranging in length from 100 to 130 millimeters.

Anchovy catches were similar to those made during the previous two years, although the large concentration of young anchovies noted in Magdalena Bay in the 1964 survey was absent in 1965.

PACIFIC MACKEREL: Pacific mackerel (*Scomber diego*) were taken in 3 trawl tows and at 1 light station, all south of Punta San Juanico. All catches were small and consisted of fish under 100 quarter-centimeters long. Those catches were even poorer than during 1964, which was by far the poorest of the previous 3 years.

JACK MACKEREL: Jack mackerel (*Trachurus symmetricus*) were taken in 8 trawl tows and at 6 light stations. The trawl catches consisted of from 1 to 12 small fish (18 to 43 quarter-centimeters long) scattered throughout the survey area. Five of the 6 night-light stations where jack mackerel were attracted were in Santa Maria Bay. The best catches there consisted of fish ranging from about 75 to 85 quarter-centimeters. No larger jack mackerel were taken. That species was about as abundant as during the previous 3 years.

OTHER SPECIES: Pacific round herring (*Etrumeus teres*) were taken at 7 trawl and 3 light stations, mostly south of Punta San Juanico. Thread herring (*Opisthonema* spp.) were taken at only one trawl station.

Pacific pompano (*Palometa simillima*) were taken frequently with the midwater trawl and made up an important part of the catch. They were taken in 13 tows, with catches of up to 700 individuals. Most were small, ranging from about 70 to 160 millimeters (2.8-6.3 in.) long.

California lizardfish (*Synodus lucioceps*) were also a frequent constituent of the trawl catch. They appeared in 9 tows in amounts up to 1,100 individuals and were all quite small, ranging from about 90 to 150 millimeters (3.5-5.9 in.) long.

Pelagic red crab (*Pleuroncodes planipes*) were caught in 9 trawl tows in amounts rang-

ing up to about a ton. Most of the catches were made south of Punta Abreojos and were also present at 4 light stations. Squid (*Loligo opalescens*) were present at 10 light stations and were caught in 10 trawl tows.

OTHER ACTIVITIES: Night scouting was accomplished only while running between light stations and the coverage was quite limited. A total of 69 anchovy, 4 mackerel, and 36 unidentified schools were seen. Most of the anchovy schools were near Punta Abreojos, and most of the unidentified schools were near Punta Asuncion.

Sea surface temperatures during the cruise ranged from 13.4° C. (56.1° F.) near Punta Eugenia to 23.3° C. (73.9° F.) just north of Cabo San Lazaro. Temperatures were again quite cool north of Punta Abreojos, with most readings between 16.0° and 19.0° C. (60.8° and 66.2° F.). Weather and sea conditions were good during the entire cruise and permitted completion of all planned work.

M/V "Alaska" Cruise 65-A-7-Pelagic Fish (August 17-September 3, 1965): The coastal waters of central Baja California, Mexico, from Cedros Island to Point Canoa were surveyed on this cruise. Objectives were to: (1) survey the fish and invertebrates of the inshore pelagic environment; (2) determine the amount of recruitment from the 1965 Pacific sardine spawning and to measure the population density of older fish, (3) determine the distribution and abundance of northern anchovies, Pacific mackerel, and jack mackerel; (4) collect eye lens of various species for genetic studies.

The survey was conducted by fishing a midwater trawl and a blanketnet at night. A total of 21 midwater-trawl and 18 blanketnet stations was occupied, and 147 miles of night visual scouting were logged.

Anchovies were caught on 13 stations, sardines on 9, jack mackerel on 5, and Pacific mackerel on 2. All but 4 sardine samples and one jack mackerel sample were taken on midwater trawl stations. Night scouting detected 30 anchovy and 2 sardine schools. Squid, salps, and ctenophores were caught in small quantities, rarely exceeding 10 pounds per catch. Mechanical difficulties prevented completion of work scheduled for this cruise.

NORTHERN ANCHOVIES: Anchovies were present in the vicinity of Cedros Island and

in the northern half of Sebastian Vizcaino Bay. Extremely heavy concentrations of small fish (66-88 millimeters or 2.6 to 3.5 inches long) were schooled in South Bay, Cedros Island. A 30-minute trawl tow there took 650 pounds, the best catch of the cruise.

From Santa Rosalia Bay northward, anchovies became increasingly abundant although very few were caught less than 3 miles from shore. Adults predominated in that area, with most fish exceeding 110 millimeters (4.3 inches) in length. Catches ranged from several fish up to 2,700 fish (35 pounds).

Anchovies were very scarce in the southern half of Sebastian Vizcaino Bay where sardines were predominant. Almost all school sightings were made off Blanca Bay; they were large in area but thin in depth. Trawls on those schools yielded poor catches because the net passed beneath the fish. Blanketnet stations were totally ineffective in sampling anchovies due to negative phototactic behavior of this species. But catches were considerably better than on the previous year's survey, and adult fish made up a greater proportion of the catch.

PACIFIC SARDINES: Sardines were present in South Bay, Cedros Island, and in the southern portion of Sebastian Vizcaino Bay. The 1965 year-class appeared to be another failure, as only one definite fish-of-the-year was taken. Many adult fish were in a spawning condition. Catches were considerably better than in the previous year when sardines were scarce throughout the survey area. The sardine-anchovy distribution in Sebastian Vizcaino Bay closely resembled that of the previous several years, with each species dominating a particular area of the bay. Both types of sampling gear were equally effective in catching sardines.

JACK AND PACIFIC MACKEREL: Both those species were taken in minor quantities amounting to several individuals per sample. All fish, except one sample of jack mackerel were under 100 millimeters (3.9 inches) long. No schools were seen in the survey area.

OTHER ACTIVITIES: Round herring (*Etrumeus teres*) were frequently caught mixed with sardines, and Pacific pompano (*Palaemonetes similis*) were commonly taken with anchovies. Midshipmen (*Porichthys myriaster* and *P. notatus*) appeared frequently in the trawl catches.

Sea surface temperatures taken on the cruise ranged from 75° F. at Point Malarri-mo to 65.5° F. at Blanca Bay.

M/V "Alaska" Cruise 65-A-8-Pelagic Fish (September 15-October 3, 1965): The coastal waters of northern Baja California, Mexico, from Acme Rock to the international border were surveyed during this cruise by the research vessel Alaska. Objectives were to: (1) determine the distribution and abundance of northern anchovies, Pacific mackerel, and jack mackerel; (2) determine the amount of recruitment of the 1965 Pacific sardine spawning and to measure the population density of older fish; (3) field test and evaluate a 30-foot midwater-trawl as a sampling tool; (4) collect anchovy stomachs for a food study conducted by the California Academy of Sciences; and (5) make incidental collections for aquarium display and taxonomic study.

The survey was conducted at night using a midwater-trawl and a blanketnet as sampling devices. A total of 51 midwater-trawl and 29 blanketnet stations was occupied, and 374 miles were visually scouted during the cruise. The trawl caught anchovies on 43 stations, jack mackerel on 13, sardines on 5, and Pacific mackerel on 2. The blanketnet took anchovies on 3 stations, sardines on 1, and jack mackerel on 2. Anchovies were present on 4 other blanketnet stations but none could be caught. Visual scouting detected 3 anchovy schools and 6 areas of anchovy surface scatter.

NORTHERN ANCHOVIES: Concentrations of fish were found between Acme Rock and Point Canoas, off Geronimo Island and Point San Jose, and in Colnett Bay. Trawl catches of 400 to 2,000 pounds were made in those areas, and echo-sounder fish traces were quite heavy. Catches elsewhere were generally light, with about 60 percent of all tows containing less than 1,000 fish. Echo-sounder traces were very light outside the areas of anchovy concentration.

Juvenile fish (under 90 millimeters or 3.5 inches long) were especially prevalent from Todos Santos Bay northward. Fish of that size were distributed close to shore, while adult fish were generally found 5 or more miles offshore.

Anchovy catches were quite similar to those of the previous year, except a few more large catches were made in 1965. There was

a noticeably larger proportion of "pinhead" sizes (less than 70 millimeters) on this cruise. Echo-sounder school traces were considerably lighter than during the previous several years.

PACIFIC SARDINES: Sardines were scarce over the entire survey area. Catches were very small, with most consisting of only a few individuals. Adults were taken off Point Canoas and San Carlos Anchorage, and in San Quentin Bay. Most of the larger fish were in spawning condition. The sample taken in San Quentin Bay contained some of the largest fish ever taken by the survey in Mexican waters and ranged up to 235 millimeters (9.3 inches) long. Fish of the 1965 year-class were extremely scarce. Samples consisting of 1 or 2 fish were taken at 3 widely separated stations.

JACK AND PACIFIC MACKEREL: Juvenile jack mackerel were taken in small quantities by the trawl. Most fish were less than 160 millimeters long and appeared to be fish-of-the-year. Adult fish apparently were able to avoid the trawl since only a few individuals of both species of mackerel were taken. One large school of adult jack mackerel was sampled by blanketnet in San Quentin Bay.

MIDWATER TRAWL FIELD TEST: A new midwater-trawl with a 30-foot-square mouth opening was tested as a possible substitute for the 50-foot trawl being used. The smaller net fished with a mouth opening estimated at 25-27 feet. It had small hydrofoil doors at the upper corners to spread the net horizontally and a combination of curved steel quarter doors at the lower corners and floats on the headrope to spread the net vertically. Towing speeds of up to 4 knots were achieved with no difficulty.

Although no direct comparative tows were made, the smaller net appeared to catch fish as effectively as the larger one. It caught all the program species including several large Pacific mackerel, a species which is not readily taken even with a large trawl. Several catches exceeded 400 pounds, while 40 percent of the successful tows contained 1,000 or more fish.

The greatest advantage of the small net is in the speed and ease with which it can be handled. It can be set and retrieved in one-third the time, and requires one-half as many men to operate than the larger net. Also, the smaller size and weight of all components

make it much safer to handle and thus permits the vessel to operate under more adverse weather conditions. From all indications this net will make an excellent sampling tool.

OTHER ACTIVITIES: Fair weather prevailed on this cruise and all scheduled work was completed. Sea surface temperatures ranged from 69° F. off Acme Rock to 60° F. at Point San Jose.

Note: See Commercial Fisheries Review, August 1965 p. 25.

MARINE LIFE EXPLORATIONS OFF SANTA CATALINA ISLAND:

M/V "Nautilus" Cruise 65-N-4-Exploratory (August 13-16, 1965): To conduct an ecological survey from about 100 feet of water to deep water around Santa Catalina Island was the main objective of this cruise by the research vessel Nautilus of the California Department of Fish and Game. Other objectives were to sample the marine plant and animal life of the island area with a small mid-depth trawl and lobster and fish traps. Plans were to set lobster traps in depths of 100 to 600 feet in an effort to obtain information on depth distribution of lobsters.

During the cruise, lobster traps and fish traps were wired together and fished in depths of 100 to 600 feet at 50-foot depth intervals on Farmsworth Bank in the offshore waters of Santa Catalina Island. The only trap that caught lobsters (Panulirus interruptus) was one placed at 100 feet. That trap also caught 2 swell sharks (Cephaloscyllium uter), 1 treefish (Sebastodes serriceps), and 1 red starfish. Traps set at 150 and 200 feet caught no lobsters but caught some fish--sheephead (Pimelometopon pulchrum), swell sharks, sculpin (Scorpaena guttata), and rockfish (Sebastodes spp.). Starfish and a few snails were also taken in the traps placed at those depths.

The traps set in depths of 300 to 600 feet were lost and a three-day search for them was unsuccessful.

Shallow hauls with the midwater trawl yielded no fish, and a deeper haul at 100 fathoms resulted in a badly torn net when it snagged on what presumably was a rock pinnacle.

MARINE SPORT FISH SURVEY OFF SOUTHERN CALIFORNIA:

Airplane Survey Flight 65-12 (September 13, 1965): This one-day survey was one in a series of instantaneous counts of poles and fishermen along the coastline. For this purpose, the southern California coastline from the Mexican Border to Jalama Beach State Park was surveyed from the air by the aircraft Cessna "182" N9042T of the California Department of Fish and Game. The counts made will eventually be used to determine shore-fishing effort in southern California.

The coastline was surveyed from south to north between 11:05 a.m. and 3:15 p.m., with a 1-hour stop at Goleta at 1:26 p.m.

A total of 118 fishermen and poles was counted during the survey. Eighteen persons (15.25 percent) were outside the project's regular shoreline sampling frame. Areas of heaviest effort were: south Camp Pendleton to San Clemente, Newport Beach to the Long Beach Rainbow Pier, and the Hollywood and Mandalay Beach area in Ventura County. Those three areas contained 41.5 percent of the fishermen counted.

Considerable fishing effort was noted in areas not included in the scheduled shoreline sampling. These survey flights will aid in determining appropriate correction factors for those activities.

Airplane Survey Flight 65-13 (September 28, 1965): This was another one-day survey flight by the Cessna "182" N9042T for the instantaneous count of poles and fishermen along the coastline of southern California. From the Mexican border north to Jalama Beach, the coastline was surveyed between 10:00 a.m. and 2:00 p.m., with a 1-hour stop at Goleta at 12:30 p.m.

In all, 114 poles were counted with 111 attending fishermen. Thirteen percent of the poles counted were outside the regular shoreline sampling area. Greatest concentrations of fishing effort were: Leo Carrillo State Beach north to Ventura, with 37 poles tallied (32.5 percent), and the Bolsa Chica Beach to Point Fermin area (19 poles; 16.6 percent).

Considerable fishing effort again was noted taking place outside of the line areas pre-selected for sampling. As determined from eight flights in 1965, this "outside effort" amounts to about 10 percent of the total noted.

These data will be used to adjust shoreline sampling estimates for those areas not covered, and to substantiate areas of greatest fishing activity.

Note: See Commercial Fisheries Review, August 1965 p. 27.

SEA OTTER POPULATION SURVEY:

Airplane Spotting Flight 65-11-Sea Otter (September 15, 1965): To obtain a count of California sea otters (*Enhydra lutris nereis*), the California coastline from Cayucos to Monterey was flown on September 15, 1965, by the aircraft Beechcraft N5614D of the California Department of Fish and Game. It was the third flight in a series of four to make aerial sea otter counts for 1965.

Weather conditions were marginal during the flight and extensive fog patches along the coast restricted visibility considerably. Weather conditions also delayed the airplane's takeoff so the count was made later than the optimum hours most effective for this type of survey. Because of the marginal flying conditions, together with the fact that the otters were widely scattered, a low count was obtained. The total count taken by three spotters was 905 otters.

Note: See Commercial Fisheries Review, May 1964 p. 13.

ANCHOVY FISHING PROPOSALS RESET FOR CONSIDERATION BY STATE FISH AND GAME COMMISSION:

Proposed 1965/66 regulations to govern an experimental commercial anchovy reduction fishery in California's offshore waters were rescheduled for consideration November 12, 1965, at a California State Fish and Game Commission meeting in San Diego. (At its October 1 meeting in Los Angeles, the Commission had tentatively deferred action on the proposed anchovy regulations until December 10, and adopted a resolution requesting the Governor to place the entire question of anchovy and sardine resource management before the Special Session of the California Legislature.)

In announcing his decision to reset Commission consideration of proposed regulations and permits to the November 12 agenda, the Commission president said, in part, "Since legislative resolve of the matters identified in our resolution obviously will not be forthcoming before December 10, there appears

to be no justification for further delay of Commission action on the proposals and applications now on file. . . ."

The proposed regulations would permit an experimental fishery for the taking of up to 115,000 tons of anchovies through April 30, 1966, by commercial fishing vessels for reduction into fish meal and other byproducts. The California Department of Fish and Game recommends that 100,000 tons be taken in Southern California waters and 15,000 tons from offshore waters north of Point Conception.

The proposal emphasizes the experimental nature of the recommended regulations, and would provide that the commercial anchovy reduction fishery may be terminated at any time the Commission feels such action would be in the best interest of the pelagic fish resource.

Consideration of applications from nine commercial fishery firms for anchovy reduction permits was also scheduled for the November 12 meeting. (California Department of Fish and Game, October 30, 1965.)

EMPLOYMENT OPPORTUNITIES FOR BIOLOGISTS WITH CALIFORNIA DEPARTMENT OF FISH AND GAME:

The California State Personnel Board has announced open nationwide examinations for qualified biologists interested in career employment with the California State Department of Fish and Game as follows:

Classification	Monthly Salary
Fishery Biologist II	\$590-717
Marine Biologist II	590-717
Fishery Biologist III	717-870
Pollution Bioanalyst II	590-717
Pollution Bioanalyst III	717-870
Pollution Bioanalyst IV	829-1,088
Marine Biologist III	717-870

For the first three positions listed, the closing date for filing applications is February 4, 1966, and written examinations will be given March 6, 1966. For the last four positions listed, the closing date for filing applications is January 28, 1966, and written examinations will be given February 26, 1966.

Written examinations and subsequent personal interviews for applicants will be held in California and such other States as the number of candidates warrant and conditions permit. Personal interviews are planned for certain major cities throughout the United States. Admission to the examinations requires a college degree in biological sciences and varying amounts of either graduate work or experience in fishery research or water pollution studies.

Interested persons may obtain applications and further information by writing: State Personnel Board (Attn: Recruitment Section), 801 Capitol Mall, Sacramento, Calif. 95814.



Cans--Shipments for Fishery Products, January-August 1965

A total of 2,077,256 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-

August 1965 as compared with 1,918,909 base boxes used during the same period in 1964. In 1965, there was an increase in the U. S. canned pack of Maine sardines and Gulf shrimp, but there was some decline in the pack of canned tuna and salmon.



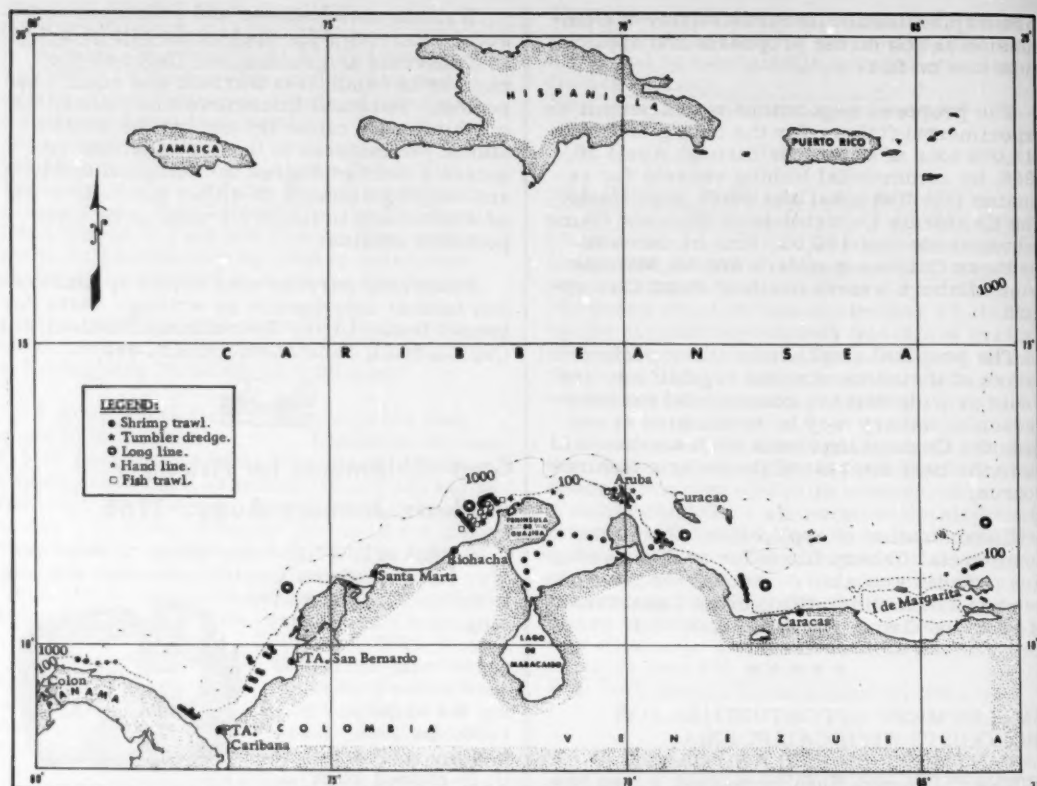
Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.



Caribbean and Tropical Atlantic Fisheries Explorations

TRAWLING EXPLORATIONS IN SOUTHERN CARIBBEAN:

M/V "Oregon" Cruise 104 (September 14-October 30, 1965): Exploratory fishing with trawls, long lines, and other types of gear was conducted in the southern Caribbean Sea by the U. S. Bureau of Commercial Fisheries research vessel Oregon during September and October 1965. Working in cooperation



Areas investigated during Cruise 104 of the M/V Oregon (September 14-October 30, 1965).

with the Instituto Venezolano de Investigaciones Científicas (IVIC) and the United Nations Special Fund Caribbean Fisheries Project (UNSCFP), the *Oregon* carried out trawling explorations off central and western Venezuela, in the Gulf of Venezuela, and in the area surrounding Aruba, Netherlands Antilles. A fall-season survey of the outer shelf brown-shrimp beds off southern Colombia found by the *Oregon* during a trawling survey in 1964 was also completed on this cruise. Night long-lining for swordfish was carried out in coordination with the hydrographic track of the Bureau's research vessel *Geronimo*, which was transecting the southern Caribbean region at the same time.

During this cruise, fishing activities conducted were: 60 shrimp trawl stations (44 at shelf depths, 16 at slope depths); 15 fish trawl stations; 24 dredge stations; 5 long-line stations (500 to 890 hooks each); 5 hand-

line stations; 2 gill-net stations; and 5 night-light-dip net and 7 temperature stations.

SHRIMP: Shallow-water shrimp catches were generally poor. Exploratory drags were made with 40-foot flat trawls. Double-rig drags were made using 40-foot and 65-foot flat trawls. Hourly catch rates east of 70° west longitude were all below 5 pounds per hour. Two transects in the Gulf of Venezuela (made in cooperation with IVIC) caught brown shrimp at rates of 20 pounds per hour or less, and white shrimp at rates of 12 pounds per hour or less. Heavy seas and 65-knot winds interrupted further planned studies in the Gulf. West of Pen. de Guajira catch rates of brown shrimp were under 10 pounds per hour. Off southern Colombia, between Pta. San Bernardo and Cabo Tiburon in depths of 25 to 40 fathoms, catches of brown shrimp in mixed sizes (averaging 31-35 count heads-off) reached a high of 58 pounds in a 90-minute drag with a

65-foot trawl. Two and three-hour drags with double-rigged 40- and 65-foot nets yielded catches of 50 to 70 pounds of heads-on brown shrimp which yielded under 2 boxes of headless shrimp per night. Those catches were uniformly lower than those made during the spring 1964 cruise.

Deep-water shrimp concentrations were also low. Royal-red shrimp catches of 20 and 35 pounds, and mixed species catches of 50 pounds were made in 250 to 275 fathoms off the Golfo de Triste, Venezuela. Catches off Pena, de Paraguana, Pena, de Guajira, and southern Colombia were under 10 pounds per hour.

SWORDFISH: Two to four swordfish ranging from 25 to 225 pounds each were taken on all long-line sets, with the exception of a set made off Guajira. The Guajira set yielded a record catch of 103 sharks--101 were silks weighing a total of 7.5 tons. Excessive gear damage was experienced, including the loss of 16 baskets (160 hooks) of long-line gear.

FISH TRAWLING: An experimental fish trawl was tested on rough bottom areas west of Aruba and off Guajira. Food fish catches were small, the best haul accounting for only 88 pounds of grouper and snapper. The catches from the Aruba area were very poor and dredge sampling indicated only "dead bottom."

TUNA OBSERVATIONS: Trolling lines were run between stations and while cruising during daylight hours. Trolling catches made consisted of 7 blackfin tuna, 7 yellowfin tuna, 9 white skipjack tuna, 1 little tuna, 13 dolphin, 1 king mackerel, 1 wahoo, 5 barracuda, 1 spearfish, and 1 frigate mackerel. Identified tuna schools off Venezuela and Colombia included 5 blackfin, 2 yellowfin, 4 skipjack, and 1 little tuna. On October 19, numerous large schools of small blackfin (estimated 3-5 pounds average) were observed and photographed 8 to 12 miles off Pta. de San Blas, Panama.

Note: See *Commercial Fisheries Review*, September 1965 p. 43; January 1965 p. 19; September 1964 p. 22.



Central Pacific Fisheries Investigations

FUNCTION OF DARK AND LIGHT MUSCLE IN TUNA STUDIED:

The backbone of the skipjack tuna is sheathed in a dark red muscle. Outside the

dark muscle lies a thicker layer of muscle lighter red in color. The two types of muscle differ sharply in their chemical makeup. This has suggested to at least one European scientist, who worked on a related species of tuna, that the relatively small dark muscle is "scarcely suited for strenuous and continued activities." He believes that the dark muscle in fish is somewhat similar to the liver in man--a storage organ in which certain substances are held until required by the body. This rather widely accepted hypothesis has now been challenged by an electrophysiologist working in Hawaii.

A study of the function of dark and light muscle in various species of tuna is being conducted under a contract between the University of Hawaii and the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu. The studies are being made by an Assistant Professor of Physiology of the University's Pacific Biomedical Research Center. His present work is being done at the Honolulu Biological Laboratory's Kewalo Basin Docks, the only place in the world where living tuna are regularly available for research. There under a large circular tent are located the several pools where tuna are being used in pioneering experimental studies of behavior and physiology. The tent provides needed shade to the pools.

The University professor's research on living tuna suggests that the central dark muscle is responsible for one of the most characteristic behavioral traits of tuna--that is their ceaseless swimming. The Kewalo Basin Docks has allowed Honolulu Laboratory scientists to document the fact that tuna never stop swimming, day or night. And although the fish is capable of bursts of considerable speed (20 miles an hour and perhaps much more), as a rule it swims quite slowly, at about 2 miles an hour. If it failed to do so, it would sink and suffocate.

This ceaseless swimming, which must begin soon after the tuna is hatched and lasts until it dies, is maintained almost exclusively by the red muscle, the professor believes. His method of documenting this is ingenious. He has constructed a plastic water-filled tank into which a tuna just fits. The fish is held gently in place by a rubber ring girdling its midsection. Oxygenated sea water flows through the gills (tuna obtain vital oxygen from the water by swimming with their mouths open, and the flowing water performs this

function for the experimental specimen. The fish's tail is free to beat in swimming movements. By sampling electrical activity from minute areas within the fish's muscles, the researcher is able to pinpoint accurately the muscle regions used in swimming movements. As a rule, these lie within the central red muscle. Only when the fish's flanks are touched and it begins to thresh about does the lighter muscle register electrical activity.

The lighter muscle thus offers the fish emergency power, which presumably is used in darting after prey or eluding predators. But it is power quickly spent. On the other hand, the dark muscle represents a source of low but constant energy. The difference resembles that between a pilot light and a flame hot enough to broil.

The professor's work casts doubt not on the biochemical evidence of the earlier investigations, but on the interpretation of it. There is no doubt that the chemical constitution of the dark muscle differs from that of the lighter. But contrary to earlier belief, the dark muscle does play a part, and it turns out to be a key part, in the muscular activity of the fish.

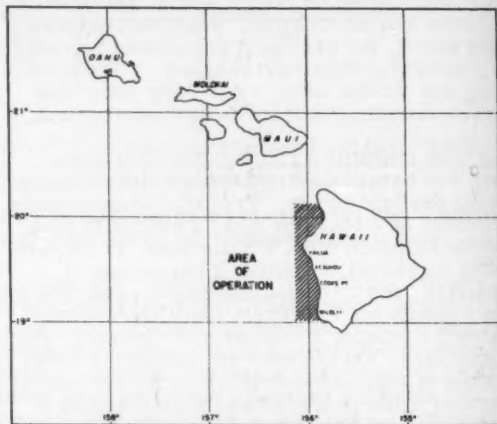
The professor working on the muscle study is one of three scientists using the Bureau's Honolulu Biological Laboratory's facilities to study aspects of tuna locomotion. The others are Assistant Professors of Zoology at the University of Hawaii. One of those scientists is interested in the hydrostatic aspects of tuna locomotion--how they maintain swimming depth. The other scientist is investigating oxygen consumption by the fish.

The scientist conducting the muscle study foresees the possibility that the three lines of approach will converge in the future, so that the scientists will be able to describe precisely how the tuna swims and how it affects its environment as it swims. His research is among the most sophisticated as yet performed on the skipjack tuna, "a species that before this has been largely inaccessible to experimental biologists," says one of the scientists working on tuna locomotion. The success of the electrophysiological experiments, in which the fish can be kept in a small tank for several hours, opens several new possibilities for research on tuna.

MARINE LIFE BEHAVIOR AND RELATED BIOLOGICAL OBSERVATIONS:

M/V "Townsend Cromwell" Cruise 18 (July 25-August 27, 1965): Observations of the ecology and behavior of the marine-life community in the area of a drifting and anchored raft were among the several objectives of this cruise. The area in which the research vessel Townsend Cromwell of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, operated during the cruise was within 10 miles off the west coast of Hawaii between latitude 19° and $20^{\circ}10' N$.

The observation raft was launched from the research vessel about 6 miles northwest of Milolii. From August 1-26, the raft drifted or was anchored off the west coast of Hawaii. During the cruise it was in the water a total of 466 hours; it was anchored for 266 hours, drifted for 168 hours, and was under tow by the vessel for 32 hours. Observations from the underwater chamber of the vessel during this phase of the cruise were made almost continuously except when the raft was being towed.



Area of operations during M/V Townsend Cromwell Cruise 18 (July 25-August 27, 1965).

Species observed around the raft were: skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), dolphin (*Coryphaena hippurus*), triggerfish (*Canthidermis maculatus*), filefish (*Alutera scripta*), mackerel scad (*Decapterus pinnulatus*), jack (*Seriola* sp.), pilotfish (*Naucratus ductor*), driftfish (*Psenes cyanophrys*), man-of-war fish (*Nomeus gronovii*), rudderfish (*Kyphosus cinerascens*), damselfish (*Abudefduf abdomi-*

nalis), goatfish (*Mulloidichthys auriflamma*), barracuda (*Sphyræna barracuda*), marlin (*Makaira ampla*), and white tip shark (*Carcharhinus longimanus*). Schools of propoise and pilot whales were also seen. About 2,800 feet of 16-mm. movies and numerous still pictures were taken.

Another objective of the cruise was to investigate the use of underwater sound as a method of influencing the behavior of tuna and other species.

Twelve days were spent in transmitting underwater sounds by J-9 transducers. Forty-six 1-hour periods of sound transmission were paired with 46 hours of silence. Sounds transmitted included swimming sounds made by schools of anchovy and miscellaneous sounds consisting of pure tones and sounds made by other marine animals.

During the 12-day period the large predators which appeared at the raft included yellowfin tuna, porpoise, pilot whales, and others, as well as smaller fish. There were no obvious overt reactions by any of those species to the transmitted sounds. The data were to be analyzed to determine if the fish were attracted to the raft by the sounds or displayed any subtle behavioral traits during the periods of sound transmission.

During this phase of the cruise, a continuous watch was maintained on a listening hydrophone. Recordings were made of the pulsed sounds which were transmitted for spectrographic analysis. No sounds attributable to fish were noted.

To investigate the use of food odor as a method of influencing the behavior of tuna and other marine life was another objective. During a 10-day experiment an odor made from squid (*Loligo opalescens*) was released from the anchored raft for 23 two-hour periods alternated with 23 two-hour periods during which no odor was released. Although skipjack tuna were sighted within $\frac{1}{2}$ mile of the raft, none came into the immediate vicinity during the odor experiments. There was no evidence that tuna or other fish species were initially attracted to the raft by the squid odor; excellent observations were made, however, which show that dolphin were able to detect the odor and could follow an odor gradient to its source from distances of about 65 feet.

Fish caught from around the raft were collected and preserved, and the stomach contents of 50 dolphin caught at the raft were recorded or preserved. Numerous fish were collected at the raft during night-light stations. These were brought back alive for further observation at the laboratory.

Numbered foam plastic sheets were released to obtain information on surface currents during the International Billfish Tournament. On July 26 they were released at 1-mile intervals from 1 to 5 miles west of Cook Pt., from 1 to 5 miles west of Keauhou and from 2 to 6 miles west of Kailua. The same release pattern was repeated on July 28. Ten drift cards were released with each plastic sheet. The sport-fishing fleet provided excellent assistance in the study of near-shore currents, by reporting sightings of the sheets from July 26 to 31. As a result it was possible to determine the current patterns. A pair of eddies were present offshore, with a band of easterly current between them. This onshore current split into north- and south-moving currents when it reached the coast. The location of the axis of the onshore current shifted a distance of about 15 miles southward during the week of the tournament.

Other operations during the cruise included a standard watch for fish, birds, and aquatic mammals, the usual series of bathythermograms, surface plankton tows, and collection of other oceanographic data.

Note: See Commercial Fisheries Review, June 1964 p. 12.

SUBMARINE TESTED IN UNDERWATER RESEARCH:

M/V "Townsend Cromwell" Cruise 19 (September 16-October 17, 1965): The research vessel Townsend Cromwell and the Nenuë II provided support facilities for the submarine Asherah during diving operations designed to aid in the Bureau's planning and development of a large research submarine. The Asherah is a small underwater craft leased by the Bureau's Honolulu Biological Laboratory for a 4-week period of research dives.

The Asherah made 50 dives in an area off Campbell Industrial Park near Barber's Point, Oahu. One was a shakedown dive, 19 were staff research orientation dives, and 30 had research and development as the principal objectives.

Portions of 8 dives by the *Asherah* were devoted to describing the plankton community and its migrations. Dives were made both day and night, and with and without artificial lights. Tuna forage organisms were enumerated and studied on portions of 13 dives, and tuna were encountered in 6 dives. These tuna, skipjack and little tuna, were encountered between 320 and 500 feet, usually in groups of 3 to 6 fish, but once in a school of 250 individuals, and another time associated with a school of 30 jack.

Tuna forage organisms consisted of four species of small fish, occurring in large schools between depths of 350 and 600 feet. Only one forage species was identified. Some schools of forage were estimated to contain as much as 300 "buckets" of bait-sized fish. Peculiar inverted circular swimming was noted for another kind of tuna forage, mackerel scad (*opelu*), on one occasion.

Two of the *Asherah* dives were devoted to evaluating the performance of plankton nets, and one to observing the path of fall of XBT's. None of the gear tests was particularly successful. A total of 17 dives was made for surveying the bottom, and additional information on the bottom and its resources was obtained in 10 other dives. Species lists were prepared for the depth range of 100 to 630 feet, including fish, corals (including red coral), lobsters, fish-cleaning stations, and other organisms and ecological situations.

Two dives involved measuring light attenuation by photographing plaques of known reflectance at different depths. Four dives were made to record the sounds produced by various soniferous animals. Among the sounds obtained were those of squirrelfish and triggerfish. On one dive the current was measured by suspending the submarine from a plastic float, whose drift was noted on the surface.

A diving log was kept for all dives made by the *Asherah*. Over 50 people participated in this cruise because of the large number of demonstrations made.

Note: See *Commercial Fisheries Review*, December 1965 p. 29.



Education

"SEA-GRANT" COLLEGES RECOMMENDED BY NATIONAL CONFERENCE AT UNIVERSITY OF RHODE ISLAND:

A proposal that the United States develop "sea-grant" colleges was endorsed at a 2-day meeting in Newport, Rhode Island, October 28-29, 1965. Meeting was attended by 230 scientists and educators representing all the important fishery States of the Pacific, Atlantic, and Gulf Coasts, as well as the Great Lakes.

The conference on "The Concept of a Sea-Grant University," sponsored by the University of Rhode Island and the Southern New England Marine Sciences Association, also recommended that Dr. Athelstan Spilhaus of the University of Minnesota, originator of the "sea-grant" idea, be given the opportunity to outline his ideas to "appropriate Government bodies."

Dr. Spilhaus opened the conference with a call for a national "man-in-the-sea" program. He said, "It is not necessary for us to occupy the ocean now, but if we don't someone else will. We can choose peaceful exploration and colonization of the sea and in doing this we are inventing the future." There is a gap, he said, between our scientists and those who use the sea, and this gap must be filled by ocean engineers. That is one of the reasons "sea-grant" colleges are needed.

The dean of the University of Rhode Island Graduate School of Oceanography announced that nine other scientists had agreed to work with him on a "National Sea-Grant University Committee." He will serve as secretary and the only officer of the group.

The conference also went on record as favoring in general principle the proposed sea-grant legislation (S. 2439) which has been introduced in Congress by Senator Claiborne Pell of Rhode Island. He has asked that 10 percent of the Government funds received from the lease of offshore lands be used to finance "sea-grant" colleges. It has been estimated this would amount to \$10 million or more a year. The bill is now before the Senate Labor and Public Welfare Committee. Hearings are expected to be held early in 1966. (University of Rhode Island, November 2, 1965.)



Federal Purchases of Fishery Products

DEFENSE DEPARTMENT REVISES INSPECTION CRITERIA FOR FOOD ESTABLISHMENTS:

DPSC Clauses 690a, b, and c effective November 22, 1965, set forth revised criteria for food establishments supplying perishable "brand name items or commercial equivalent items" to the Defense Department. One of the approved inspection criteria under those regulations is:

"A plant processing fish and other waterfoods under the continuous inspection supervision of the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, U. S. Department of Interior, in officially listed establishments for that service, provided further that each primary container shall be stamped or printed with: (i) the U. S. Grade stamp or shield; or (ii) the words: 'Packed by (firm's name) under continuous inspection of the Department of the Interior,' or 'Packed under continuous inspection of the Department of the Interior'; or (iii) a combination of (i) and (ii)."

DPSC Clauses 690 were set forth in Headquarters Notice No. 138 (65), issued by the Defense Personnel Support Center (DPSC), 2800 South 20th Street, Philadelphia, Pa. 19101. The revised regulations supersede MSSA Clauses 500 of May 9, 1960, which are obsolete.

DEFENSE DEPARTMENT REVISES SUBSISTENCE CONTRACTOR INSPECTION PROCEDURES MANUAL:

On November 15, 1965, the Defense Department issued DSA-DPSC Manual 4155.5, Subsistence Contractor Inspection Procedures Manual. It sets forth procedures for the use and information of contractors who are responsible for product inspection in accordance with the requirements of Defense Personnel Support Center (DPSC) Subsistence contracts. The new manual supersedes the DSA - DSSC Contractor Inspection Procedures Manual 4155.1 dated September 3, 1963, and changes Paragraphs 1 to 7 thereof.

Even though current DPSC and DSSC Articles and Clauses may reference the superseded manual or its predecessors, the new manual will be used in all solicitations, and

their resultant contracts, issued on and after November 15, 1965.



Fisheries Laboratory

NEW GAME FISH RESEARCH LABORATORY FOR TEXAS GULF COAST:

The selection of Port Aransas, Tex., as the site for another Federal marine game fish research laboratory to be operated by the Bureau of Sport Fisheries and Wildlife was announced November 5, 1965, by Secretary of the Interior Stewart L. Udall.

The Port Aransas laboratory will cost about \$2 million to build and will be the latest in a system of centers authorized by Congress in 1959 to undertake a national research program on salt-water game fish. It will be used to study marine sport fishery resources in the Gulf of Mexico west of the Mississippi Delta.

Secretary Udall said the goal of such laboratories is to find answers needed to maintain and improve marine game fish resources through conservation and wise management. He said, "Salt-water fishing has become a major recreational pursuit of Americans, supporting a multi-million dollar segment of our economy. This new laboratory will make an important contribution by increasing knowledge of this recreational resource in the western Gulf."

Federal marine game fish laboratories already established are at Sandy Hook, N. J., Tiburon, Calif., and Narragansett, R. I. The site for a fifth laboratory at Panama City, Fla., was announced in October 1965.

Note: See Commercial Fisheries Review, December 1965 p. 31.



Fur Seals

INTERIOR DEPARTMENT TO ISSUE NEW PROPOSALS FOR PROCESSING ALASKA SKINS:

A second invitation for research and development proposals to firms interested in experimental processing of Alaska fur seal skins will soon be issued by the U. S. Department of the Interior. The announcement will be made by Interior's Bureau of Com-

mercial Fisheries in response to interest expressed by processors who were unable to offer proposals earlier this year.

There are only sufficient raw seal skins available for a very limited number of research contracts. Firms submitting acceptable proposals, however, will be asked to process sample seal skins as a demonstration of their capability in performing more extensive research and development work.

The first invitation for research and development proposals was issued by the U. S. Bureau of Commercial Fisheries March 31, 1965, with a closing date of May 17 for filing of proposals. A one-year contract was then awarded the Pierre Laclede Fur Co., St. Louis, Mo., to develop new fur seal products and improved techniques for dressing, dyeing, and finishing the skins. Another invitation for proposals is now being considered by the Bureau.

Following the Alaska seal skin research and development program announcement, a five-year production contract for processing and selling seven-eighths of the seal skins harvested in the years 1963 to 1967 was awarded the Fouke Fur Company, Greenville, S. C. The contract was signed April 30, 1965. Secretary of the Interior Stewart L. Udall said then that one-eighth of the seal skins harvested during those years was being reserved for experimental contracts with interested and qualified fur-processing concerns.

Under the new contracts, all seal skins used in the research remain the property of the U. S. Government. Most of the skins eventually will be sold at auction, and it is anticipated that the proceeds will offset the cost of the research and development work.

The U. S. Bureau of Commercial Fisheries manages the Alaska fur seal herd, comprising some 1,500,000 animals, under provisions of the North Pacific Fur Seal Conservation Convention. Each summer when the herd congregates on the Pribilof Islands in the Bering Sea, the Bureau harvests from 50,000 to 80,000 surplus young animals on a sustained yield basis. Under the Convention terms, in return for abstaining from harvesting fur seals at sea, Canada and Japan each receive 15 percent of the annual Pribilof Islands harvest, as well as a proportionate share of the seal skins taken by the Soviet

et Union on smaller rookeries off the Asian coast.

Note: See Commercial Fisheries Review, November 1965 p. 79.

PRICES FOR ALASKA SKINS AT FALL 1965 AUCTION:

The fall auction in 1965 (October 14-15) of United States Government-owned fur seal skins (11,760 dressed, dyed, machined, and finished skins and 3,138 Lakoda skins) grossed \$1.41 million. The previous auction in the spring of 1965 grossed \$1.67 million for 13,729 processed dyed skins and 5,818 Lakoda skins. Average prices at the two auctions are not entirely comparable because in the fall 1965 auction males and females were sold in mixed lots of dressed, dyed, machined, and finished (DDM&F) skins whereas in the spring the males and females were sold separately. Since higher prices are paid for straight lots of male skins, the mixed lots command a lesser price. The smaller number of females in this sale prompted the decision to sell the skins in mixed lots.

At the fall auction, the overall average price for mixed lots of male and female dyed processed skins was \$103.78, or about 13 percent below the average price for male skins in the spring auction. A breakdown of the 3 colors within the (DDM&F) group of skins shows that the fall auction included the following: Black--3,834 male and 418 female skins yielding an average of \$109.74 per skin; Kitovi--1,246 male skins yielding an average of \$94.80; and Matara--4,810 male and 1,452 female skins yielding an average of \$101.35.

The mixed lots of Matara skins showed the greatest decline (17 percent) from the average price for male skins at the previous auction. A similar comparison shows the average price of mixed lots of Black skins down about 10 percent. The Kitovi skins sold in the fall were all males and their average price was down about 2 percent.

The Lakoda (female sheared) sales at the fall auction included 1,170 Natural skins at an average price of \$80.85 (up 30 percent from the spring auction); 1,484 Brown skins at an average price of \$42.93 (down 10 percent); and 494 Black skins at an average price of \$66.97 (up 33 percent).

Note: See Commercial Fisheries Review, June 1965 p. 21, Dec. 1964 p. 40.



Great Lakes

PUBLIC HEARING HELD ON PROPOSED CHANGES IN MICHIGAN'S YELLOW PERCH FISHING REGULATIONS:

Plans of the State of Michigan Conservation Department to liberalize commercial yellow perch fishing regulations for the entire Great Lakes were heard on October 27, 1965, in Tawas City, Mich., at a joint legislative public hearing held by the State's Senate and House Conservation Committees. The hearing was on the Department's proposal to remove size limits and closed seasons for taking yellow perch in 2½-inch mesh nets used by commercial operators.

The recommended changes, tentatively approved earlier by the Conservation Commission, are geared as much to promoting better sport fishing as they are to helping commercial fishermen. Fishery specialists of the Conservation Department say that the relaxed regulations are ultimately aimed at speeding the growth of perch. This would come about, they say, from increased commercial harvests which would trigger a rapid turnover in the Great Lakes yellow perch populations to produce better fishing for all concerned.

The Department's fishery chief points out that while the lifting of commercial size limits and closed seasons will give yellow perch populations a temporary boost, the long-range forecast for that Great Lakes species presents some uncertainties. He said, "Even if our efforts to introduce predatory game fish like the coho salmon are successful in cropping down nuisance species, we can still expect the alewife to put strong pressure on yellow perch. Eventually, the alewife's competition for food and space and its predation of fish eggs is going to mean a slump in perch numbers. The goal in seeking more liberal fishing regulations for commercial operators is to ease this situation by putting perch in a healthier condition to compete with alewife. This, at least, will slow down the perch decline we expect."

The October 27 hearing was the only one held in that part of the State to meet the legal requirement of publicly airing proposed commercial fishing changes. Another public hearing on the recommended measures may take place later elsewhere in Michigan. (News Bulletin, Michigan Department of Conservation, Lansing, October 21, 1965.)

MICHIGAN POSTPONES PLAN TO INTRODUCE STRIPED BASS:

The State of Michigan Conservation Department has postponed its plans for planting striped bass in the lower Great Lakes during spring 1966 in order to concentrate on the introduction of coho salmon in northern streams. The State's Conservation Commission had previously approved the striped bass planting program but since then more has been learned about coho salmon which indicates that species may provide a bigger breakthrough in improving Great Lakes fishing than had been earlier thought.

The Department's fishery chief explained that "coho experts from the West, who ought to know, told us recently that we may have been underestimating the potential of this fish for making the grade in a big economic way in the Great Lakes." He said that the States of Washington and Oregon have in recent years come up with new techniques and information for raising, feeding, and planting coho salmon which have virtually revolutionized efforts for producing and increasing the survival of that species. He said this means that there is a much better chance of successfully introducing coho salmon in the Great Lakes than was previously realized. He added that striped bass plantings were not being discounted altogether and that in attempting to make Great Lakes fishing better, coho salmon seemed the more promising of the two species and that if it doesn't work, striped bass could be the possible "ace in the hole."

The Department fishery chief continued, "Our money, equipment, and personnel are thoroughly committed to the coho program and we don't want to water down this effort by shifting some of our attention at this time to a second species, namely the striper." He also said it is possible that the introduction of the striped bass could undercut the success of coho plantings and that in making a choice between those two species, consideration must be given to the coho because of its tremendous economic value, both to sport and to commercial fishing interests.

The key question in the Conservation Department's plans is whether the coho salmon, in the fresh waters of the Great Lakes will produce eggs that can be fertilized for hatching, naturally or artificially. Some idea about this will be gained during fall 1966 when the first runs of fast-maturing young male

coho salmon (called jacks) are expected to take place in Great Lakes streams. But the real answer won't come until the fall of 1967 when the first spawning runs are anticipated. After that, it should be known whether to stay with the coho or bring the striped bass into the picture.

Several other factors enter into the decision of Michigan to hold up the striped bass program. Among them is the matter of giving other Great Lakes states and the Province of Ontario time to complete their studies on that species. In the time it takes to check out the coho program, much can be accomplished in consolidating Michigan's studies with those of the other agencies before arriving at a definite decision on whether to attempt the introduction of striped bass, the Department head added. A delaying factor in the striped bass program is the lack of money to underwrite the effort. The Department chief and his staff estimate it would take \$100,000-200,000 during the first year to launch "striper" plantings which would have a reasonably good chance of being successful. (*News Bulletin*, Michigan Department of Conservation, Lansing, October 21, 1965.)

Note: See *Commercial Fisheries Review*, December 1965 p.32.

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MICHIGAN STREAMS SELECTED FOR FIRST SILVER SALMON PLANTINGS:

The State of Michigan Conservation Department announced in November 1965 that three northern streams have been selected to receive about 750,000 silver or coho salmon during spring 1966 when the first plantings of that species will be made. The schedule calls for 250,000 of the 5-6 inch fish to go into the Platte River near Honor in Benzie County, 300,000 into Bear Creek near Bear Lake in Manistee County, and 200,000 in the Big Huron River northeast of L'Anse in Baraga County. Those fish, descendants of the Pacific Coast salmon, are expected to migrate downstream into Lakes Michigan and Superior, grow to maturity, and return to spawn in the streams where they are to be planted. Some of the faster-growing fish may attempt migrating back to their release sites during fall 1966. Results of the program will be known better in the fall of 1967 when the first general spawning runs are expected.

In selecting the three northern streams for initial releases, the Department's fish section chief said, "We were told that our

chances of having early success in this program should be best in these waters because the habitat requirements of steelheads and cohos are much the same." The Big Huron river was picked because it also offers a particularly good natural spawning area and provides some opportunity for taking eggs to help meet future rearing operations. It is considered very similar to western streams where silver spawning occurs.

In addition to being good steelhead waters, the Platte river and Bear Creek fit ideally into plans for later capturing spawners and collecting eggs from them. Also, with the two streams' release sites located near hatchery stations where silver salmon are being raised, transportation costs will be less.

Because Lake Michigan has such an abundant food supply for silver salmon--notably the alewife--the Department has planned its first-year planting program to putting about three-quarters of its silver salmon stock into the northern Lower Peninsula streams. The other one-quarter has been reserved for the Big Huron River to take advantage of the lower degree of competition the coho will face from other fish in Lake Superior.

Besides selecting the most promising streams for first releases, the Department planned another step aimed at giving its program a successful start. This was increasing the iodine content of hatchery water supplies for silver salmon. Experience on the West Coast, where silver salmon waters are rich in iodine, shows that this mineral is a key factor in the production of fertile silver salmon eggs. It is hoped that the fortified water supplies of hatcheries will tide the fish over after they reach the Great Lakes which are deficient in iodine.

With plans taking more solid shape for the initial release of that salmon species this coming spring, the Michigan Conservation Department was notified that the State of Oregon would meet Michigan's request for 1.2 million silver salmon eggs. The first shipment of about 600,000 eggs was scheduled to be flown into Pellston, Mich., about late November. Most of those eggs and the remaining 600,000 expected to reach Michigan shortly thereafter were to be taken to the State's Oden hatchery. Some also were to go to the State's Harrietta and Thompson hatcheries in northern Michigan. Before the end of 1966, another 50,000 silver salmon

eggs of specially adaptable strains were expected to be delivered from Alaska. Also included in Michigan's planting program for 1967 is the anticipated delivery of 1.2 million silver salmon eggs from the State of Washington. (*News Bulletin*, Michigan Department of Conservation, Lansing, November 11, 1965.)
Note: See *Commercial Fisheries Review*, April 1965 p. 21.



Great Lakes Fisheries Explorations and Gear Development

LAKE SUPERIOR TRAWLING STUDIES CONTINUED:

M/V "Kaho" Cruise 29 (September 9-October 14, 1965): A 36-day exploratory fishing cruise in Lake Superior was completed October 14, 1965, by the U.S. Bureau of Commercial Fisheries research vessel Kaho. The cruise, covering the entire south shore, was the sixth exploration undertaken for the purpose of determining the potential for developing more effective and efficient methods for catching Lake Superior fish. The work is part of the Bureau's technical assistance program designed to help the Lake Superior commercial fishing industry overcome problems related to changing fish populations and resulting economic setbacks.

Primary objectives of the cruise were to: (1) determine the availability of various species of fish to bottom trawls, (2) locate additional areas suitable for bottom trawling, and (3) study vertical and horizontal distribution patterns of fish concentrations. Other objectives were to: collect fish and bottom samples for botulism and pesticide studies; collect sculpin, chub, and smelt samples for technological studies; and collect longnose sucker for biological studies. Records were kept of fin-clipped lake trout caught, and studies were continued on trout-releasing techniques. A length-weight composition study of chub was also undertaken.

Chub accounted for 53 percent of the 14,079 pounds of fish taken during the cruise; smelt accounted for 19 percent of the total catch, sucker 18 percent, lake trout 3 percent, and other species 7 percent. Trawling in depths of less than 35 fathoms yielded a catch that was about equally divided between chub, smelt, and sucker. But chub made up 84 percent of the catch taken from depths of over 35 fathoms.

Cruise highlights included the continued success of trawling for chubs at various locations along the south shore. Catch rates for chubs were generally lower than those in several previous explorations, possibly as a result of stormy weather experienced during the October cruise. A 1,200-pound catch of smelt, of which 25 percent were jumbo (6-7 fish a pound), was taken in Huron Bay. Another outstanding catch of over 1,250 pounds that included 900 pounds of longnose sucker and 250 pounds of chub was taken in a drag off Black River. A total of 28 trawl-fishing stations was established west of the Keweenaw Peninsula in addition to those located during initial operations in that area in June 1965. In setting up the new stations, depth-series evaluations were made at 7 to 60 fathoms off Ontonagon; 22 to 50 fathoms off Little Girls Point; 25 to 50 fathoms off the Brule River; and 4 to 40 fathoms off Duluth, Minn.

As on previous cruises, chub production was highest at 35-45 fathoms while trout catches were highest at 20-30 fathoms. During the October cruise, the highest average chub catch rate (on a lake-wide basis) of 217 pounds per 30-minute drag was obtained at 40 fathoms. At that depth, the average trout catch was 3 pounds (5 fish) per 30-minute drag. In shallower water, chub catches decreased while trout catches increased (75 percent of the total pounds of trout landed during the cruise was taken in water shallower than 35 fathoms). Chub catches in the eastern half of the lake were slightly higher than those west of the Keweenaw Peninsula. The best individual chub catches were 950 pounds taken at 40 fathoms in Shelter Bay and 525 pounds taken at 35 fathoms off Eagle Island north of Cornucopia. Smelt were most concentrated in 15-20 fathoms; in all drags at those depths smelt catches averaged 100 pounds per half-hour. West of the Keweenaw Peninsula, longnose sucker contributed significantly to the catch, with the largest landings (190-900 pounds) from between 30-40 fathoms.

FISHING OPERATIONS: A total of 91 drags made during the Cruise with a 52-foot (head-rope) Gulf of Mexico-type fish trawl. Forty-eight drags were conducted between Whitefish Bay and the Keweenaw Peninsula and 43 from the Keweenaw Peninsula west to Duluth. All drags were of 30-minute duration, except 13 which were terminated early due to encounters with snags, rough bottom conditions, or the presence of set-fishing gear. Three oth-

er drags were ended early because small lake trout were known to be in certain shoal waters. Snags resulting in major gear damage occurred during 2 drags and minor damage was caused by snags in 4 other drags; 22 drags involved encounters with logs, 6 of which caused major trawl damage and 14 of which caused minor damage.

FISHING RESULTS (Whitefish Bay to Keweenaw Peninsula): Chub catches in the Whitefish Bay to Munising area were light compared to previous explorations in that area; 17 drags produced a total of only 325 pounds, 40 percent of which was chub. Stormy weather probably accounted for the decline.

Except for one 950-pound catch made at 40 fathoms north of Shelter Bay, chub catches in the Munising Bay to Huron Bay region were also light and amounted to only 40 percent of the total catch of slightly over 3,200 pounds for all species in 14 drags.

In the Keweenaw Bay to Bete Grise Bay area, 17 drags produced a total of 1,240 pounds of chub--nearly 60 percent of the total catch of almost 2,100 pounds for all species. The best catches of chubs, 245 to 430 pounds a drag, were obtained at 35 to 40 fathoms off Grand Traverse and Bete Grise Bays. Due to the presence of set-fishing gear in that area it was not possible to monitor stations where high production rates of chub had occurred during previous explorations by the Kaho. In Keweenaw Bay, major gear damage occurred in 6 of 11 drags as a result of picking up large logs in the trawls.

Two catches of common whitefish, 60 and 180 pounds a drag, were taken at 10 and 35 fathoms in Munising Bay. Smelt catches of 100 pounds and over were taken at 15 fathoms in Huron Bay and between 20 and 30 fathoms in Keweenaw Bay. The best smelt catch, 1,200 pounds, was obtained in 15 fathoms in Huron Bay; 25 percent of that catch were jumbofish (6-7 fish per pound). Catches of lake trout amounted to a total of 189 pounds for all drags and 85 percent of the trout catches (161 pounds) occurred in depths of 35 fathoms and under. Two drags in Keweenaw and Huron Bay at 30 fathoms produced 14 cisco weighing 28 pounds. Suckers in amounts of over 100 pounds a drag were caught at 15 and 20 fathoms in Huron Bay and Keweenaw Bay, respectively. Catches of other species were insignificant.

FISHING RESULTS (Houghton to Duluth): In this area, echo-soundings showed that the largest concentrations of fish were off the bottom. That was probably due to an extended period of adverse weather. From Houghton to Duluth, chub were the most abundant species caught, followed by sucker and smelt. The depth distribution of chub varied within the area. From Ontonagon to Bayfield, the best catches (325 and 350 pounds) were made in 40 fathoms. In the Apostle Islands area, 300 pounds were taken in the South Channel of Madeline Island at 22 fathoms. From Cornucopia to Duluth the best catches (from 250-525 pounds) were made in 30 to 35 fathoms. The best individual landing of 525 pounds was taken from 35 fathoms off Eagle Island.

Lake trout concentrations were noted only at 30 fathoms off the Porcupine Mountains where 60 trout (45 pounds) were landed and at 22 fathoms off Madeline Island where 166 trout (60 pounds) were taken. Only 22 trout totaling 12 pounds were taken in the 18 drags from Cornucopia to Duluth. The break-off depth for trout west of the Keweenaw Peninsula was at the 35-fathom level, with 84 percent of the total trout landings made in shallower water.

Good catches of sucker were made with regularity from Ontonagon to Duluth. Six drags produced over 100 pounds and the best catch was 900 pounds. Sucker appeared at all depths from 4 to 40 fathoms with good individual catches occurring throughout that range. An average of 62 pounds a drag was obtained in 35 drags made in depths of 40 fathoms or shallower. Of the sucker catch, 81 percent by weight were longnose, the rest were common.

Smelt were generally scattered with the heaviest concentrations found at about 15 to 20 fathoms. Off Duluth, the best smelt catches were 225 pounds taken in 20 fathoms and 150 pounds from 4 fathoms. Another fair catch of 75 pounds was taken at 22 fathoms off Little Girls Point. An average of 30 pounds of burbot occurred in 75 percent of the drags west of the Keweenaw Peninsula. Catches of cisco and whitefish were minimal. Alewives occurred in only 4 drags at an average rate of only two pounds. An outstanding catch containing over 200 young-of-the-year yellow pike or walleye was made at 4 fathoms off Duluth.

HYDROGRAPHIC DATA: Thermal gradients were recorded with bathythermograph and continuous surface-temperature recorder instruments. Bottom temperatures ranged from 39° to 55° F. and surface temperatures ranged from 48° to 58° F.

Note: See *Commercial Fisheries Review*, Nov. 1965 p. 20, Sept. 1965 p. 25.



Great Lakes Fishery Investigations

BIOLOGICAL RESEARCH AND SEA LAMPREY CONTROL, OCTOBER 1965:

Some of the highlights of Great Lakes biological research by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich., during October 1965:

Lake Superior: The spawning stocks of lake trout in the Apostle Islands region of Lake Superior were sampled during October 1965. Large-mesh gill nets (4½- to 6-inch mesh) fished on Gull Island shoal yielded 683 spawning lake trout of which 74 were females. Forty-five (6.6 percent) of the spawners were fin-clipped. Catches included 30 recaptures which had been tagged and released on the shoal in former years. The catch per unit of effort was nearly the same as that in 1964, the highest recorded since the collection of records began in 1951. The lake trout ranged from 20.5 to 33.5 inches (average, 27.0 inches) long. Only one fish had a fresh lamprey wound; old scars were present on 49 percent of the lake trout.

Small-mesh gill nets (1½- and 2½-inch mesh) fished on Gull Island shoal yielded longnose suckers, round whitefish, lake herring, and lake northern chubs. Several stomachs were examined of each species and lake trout eggs were found only in the stomach of one longnose sucker. Several trawl hauls made off Outer Island and Cat Island did not yield any young-of-the-year lake trout.

Lake Erie: Commercial fish landings along the entire south shore of Lake Erie, Saginaw Bay, and Green Bay were sampled during October 1965. Experimental trawling with the U. S. Bureau of Commercial Fisheries research vessel *Musky II* was unproductive on the sampling grounds when the fish moved into deeper areas of the lake because of unusually early cooling of the water.

Lake Michigan: In the program on the interrelationships of the alewife with native

species in Lake Michigan, studies on food preferences were continued by the Bureau's laboratory staff. Additional information was developed on the changes in growth, length, and weight of bloaters in Lake Michigan.

Sea Lamprey Control and Research: Chemical treatment of streams ended on Lake Superior with the completion of 3 river systems (Gratiot, Huron, and Buck Bay Creek). Treatment operations on Lake Michigan also ended for the season when 4 tributaries of the St. Joseph River were treated by the end of October. Bioassay ranges in those southern streams were high, ranging from 11.0-29.0 ppm.

The tagging of parasitic-phase sea lampreys has been intensified by the Bureau and the Fisheries Research Board of Canada has joined in the operation. Through October 31, 1965, a total of 1,003 sea lampreys had been tagged. Tags were recovered by commercial fishermen from 46 of the sea lampreys tagged during fall 1965.

Fyke nets were fished in 10 streams tributary to Lake Superior and 5 streams in northern Green Bay.

The experimental population of sea lamprey larvae in the Big Garlic River produced its first parasitic-phase lampreys. Two were taken at the incline trap during October.



Gulf Fisheries Explorations and Gear Development

SHRIMP GEAR STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 62 (October 11-November 5, 1965): A 26-day exploratory cruise in the northeastern and north central Gulf of Mexico by the U. S. Bureau of Commercial Fisheries research vessel *George M. Bowers* was completed on November 6, 1965. Original purpose of the cruise was to photograph bottom trawling conditions and marine life on the royal-red shrimp grounds of the north central Gulf. This was to be in preparation for working on those grounds with a modified deepwater electric shrimp trawl, and also for additions to the *Atlas of Gulf Bottom Conditions* being compiled by the Bureau.

Because of mechanical failures of camera and winch in deep water, complete objectives were not attained. The vessel spent the latter part of the cruise searching for an area of shallow water shrimp concentrations adequate for commercial testing of the electrical shrimp trawl. Shallow water shrimp stocks were found to be light and not adequate at that time in the north central or northeastern Gulf for commercial testing of the electrical trawl alongside conventional trawls.

Note: See Commercial Fisheries Review, December 1965 p. 33.



Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-34 (October 28-31, 1965): White shrimp were predominant in the catches made during this cruise by the research vessel Gus III chartered by the U. S. Bureau of Commercial Fisheries. As part of a continuing Gulf of Mexico shrimp distribution study, 3 statistical areas were covered and 11 standard 3-hour tows with a 45-foot flat trawl were made. Other operations included 23 plankton tows, 5 dredge hauls, 19 bathythermograph (BT), and 162 water (Nansen bottle) casts.

The largest catches of white shrimp made on the cruise were in area 13. The up to 10-fathom depth of that area yielded 61 pounds of 21-25 count white shrimp, and 17 pounds of 15-20 count were taken in the 11-20 fathom depth. The three depth ranges worked in that area yielded only very small quantities of small brown shrimp.

Area 14 yielded 43 pounds of 26-30 count brown shrimp from the over 20-fathom depth. Other depths in that area were mostly unproductive and accounted for only a scattering of brown and white shrimp.

Large brown shrimp (9 pounds of 12-15 count) were caught in the over 20-fathom depth of area 16. Hauls from the other two depths yielded nothing.

Note: See Commercial Fisheries Review, December 1965 p. 33.



Gulf States

FISHERY LANDINGS, 1964:

Fish and shellfish landings during 1964 in the Gulf States (west coast of Florida, Alabama, Mississippi, Louisiana, and Texas) amounted to 1.3 billion pounds valued at a record \$99.3 million ex-vessel. This was a decline from the previous year of about 82 million pounds, but an increase of \$508,000.



Medium trawler at the dock in Westwego, La.

The lower quantity in 1964 resulted chiefly from a marked decline in landings of menhaden (904 million pounds)--down 64 million, and shrimp (179 million pounds)--down 24 million. Smaller losses occurred in landings of hard blue crabs and oysters. The principal increase was in landings of unclassified species used for bait, reduction, and animal food (87 million pounds)--a gain of more than 6 million pounds as compared with 1963. Landings of red snapper (13.3 million pounds) were slightly greater than the previous year, and only 300,000 pounds less than the record production of 1902.

Three States (Louisiana, Mississippi, and Texas) accounted for 1.2 billion pounds (89 percent) of the total quantity; while Louisiana, Texas, and the west coast of Florida accounted for \$87 million (88 percent) of the value.

In 1964, there were 25,171 fishermen engaged in the Gulf fishery--688 more than in the previous year. Commercial fishing craft operating in those States during 1964 consisted of 3,582 vessels of 5 net tons and over, 10,149 motor boats, and 595 other boats.

Hawaii

FISHERY LANDINGS, 1964:

Commercial landings of fish and shellfish in the State of Hawaii in 1964 were 12.7 million pounds valued at ex-vessel \$2.8 million. Compared with 1963, this was a gain of about 1.0 million pounds (8 percent) and \$168,500 (6 percent).



Hawaiian sampan fishing skipjack tuna.

The increase in both quantity and value of the 1964 catch resulted principally from greater landings of skipjack (9.0 million pounds--up 924,000) and yellowfin tuna (500,000 pounds--up 115,000). Other species showing production gains were striped marlin, jack crevalle, and bigeye scad. There were slight declines in landings of big-eyed tuna, dolphin, and jack mackerel.

Oahu led the islands in landings with 10 million pounds--80 percent of the total. The Island of Hawaii was next with 1.6 million pounds, followed by Maui with 712,000 pounds. The remainder of the catch was landed in the Islands of Kauai, Molokai, and Lanai.

The 1964 catch was taken by 743 fishermen--77 less than in 1963. Fishing craft operated during the year included 57 vessels of 5 net tons and over, 350 motor boats, and 24 other boats.

Note: See Commercial Fisheries Review, June 1964 p. 16.



Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-September 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 9 months in 1965 amounted to 445,878 short tons--103,217 tons (or 19.5 percent) less than during the same period in 1964. Domestic production was 1,460 tons (or 0.7 percent) less, and imports were 106,757 tons (or 30.0 percent) lower than in January-September 1964. Peru continued to lead other countries with shipments of 204,345 tons.

U. S. Supply of Fish Meal and Solubles, January-September 1965			
Item	Jan.-Sept.		Total 1964
	1/1965	1964	
. . . (Short Tons) . . .			
Fish Meal and Scrap:			
Domestic production:			
Menhaden	150,690	143,455	160,349
Tuna and mackerel	19,674	15,483	21,113
Herring	11,118	7,744	8,881
Other	15,236	31,486	44,909
Total production	196,718	198,178	235,252
Imports:			
Canada	32,623	42,819	54,769
Peru	204,345	285,770	348,025
Chile	5,132	11,302	12,942
Norway	49	-	-
So. Africa Rep.	2,900	13,087	18,581
Other countries	4,111	2,939	4,826
Total imports	249,160	355,917	439,143
Available fish meal supply . . .	445,878	554,095	674,395
Fish Solubles:			
Domestic production 2/	80,082	81,655	93,296
Imports:			
Canada	1,253	1,226	1,553
So. Africa Rep.	-	1,355	987
Other countries	2,504	1,735	1,965
Total imports	3,757	3,396	4,505
Available fish solubles supply	83,839	85,351	97,801
1/ Preliminary.			
2/ 50-percent solids.			

The United States supply of fish solubles during January-September 1965 amounted to 83,839 tons--a decrease of 2.0 percent as compared with the same period in 1964. Domestic production dropped 1.9 percent and imports of fish solubles decreased 3.6 percent.

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES:

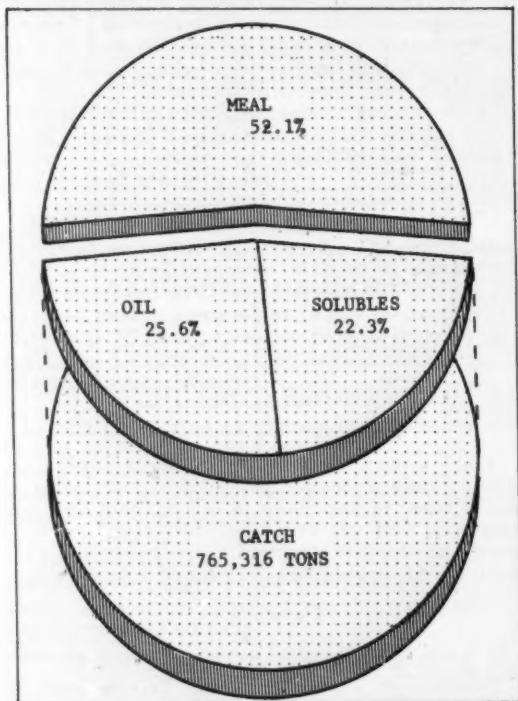
Production, September 1965: During September 1965, a total of 19,637 tons of fish meal and about 17.7 million pounds of marine-animal oil was produced in the United States. Compared with September 1964 this was a decrease of 3,181 tons of fish meal and 2.1

U. S. Production of Fish Meal, Oil, and Solubles, September 1965 1/ with Comparisons				
Product	Sept.		Jan.-Sept.	
	1/1965	1964	1/1965	1964
..... (Short Tons)				
Fish Meal and Scrap:				
Herring	1,464	646	11,118	7,744
Menhaden 2/	14,659	18,034	150,690	143,455
Tuna and mackerel	2,511	2,463	19,674	15,493
Unclassified	1,003	1,675	15,236	31,486
Total	3/19,637	3/22,818	3/196,718	3/198,178
Fish solubles:				
Menhaden	7,403	7,764	64,535	62,070
Other	1,632	2,184	15,547	19,585
Total	9,035	9,948	80,082	81,655
..... (1,000 Pounds)				
Oil, body:				
Herring	884	343	7,009	9,536
Menhaden 2/	15,793	18,073	155,552	140,911
Tuna and mackerel	570	583	3,506	3,422
Other (inc. whale)	416	781	4,180	6,677
Total oil	17,663	19,780	170,247	160,546

1/ Preliminary data.

2/ Includes a small quantity of thread herring.

3/ Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.



U. S. menhaden catch and products, 1964.

million pounds of marine-animal oil. Fish solubles production amounted to 9,035 tons--

a decrease of 913 tons as compared with September 1964.



Inland Fisheries Explorations and Gear Development

OAHE RESERVOIR TRAWLING STUDIES:

Reservoir Research Vessel "Hiodon" Cruise 4 (September 1965): To (1) find areas for effective bottom trawling and (2) collect catch and biological data were the main objectives of this cruise in Oahe Reservoir located in South and North Dakota. This trawling operation by reservoir fishery research vessel Hiodon of the U. S. Bureau of Commercial Fisheries was carried out in Zones 1 and 3 (reservoir miles 8 and 63) during September 8-10 and in Zone 6 (reservoir miles 122-123) on September 15, 21, and 24, 1965.

FISHING OPERATIONS: A 52-foot trawl was used to make seven 15-minute drags in Zones 1 and 3, and 18 drags in Zone 6. All drags were made over inundated flats at depths ranging from 24 to 90 feet.

FISHING RESULTS: Zones 1 and 3: Seven drags in the lower reservoir caught 3,280 fish (age group II or older) that weighed a total of 1,315 pounds, for an average of 469 fish or 188 pounds per drag. Carp and yellow perch combined made up 94.6 percent of the catch by number and 86.6 percent by weight. About 75 percent of the carp were small and averaged 14.7 inches and 1.5 pounds, whereas larger carp averaged about 22 inches and 3.2 pounds. Perch averaged slightly over 0.1 pound and were in the 6-inch class.

Goldeye was the only other species taken in substantial numbers and made up 3.8 percent of the catch by number and 8.6 percent by weight.

The most productive drag took 1,658 fish that weighed 563 pounds and consisted primarily of carp (125 fish or 306 pounds) and perch (1,516 fish or 224 pounds).

Yearling fish taken were 4 sauger and one each of yellow pike or walleye, black bullhead, and channel catfish.

Young-of-the-year fish were taken in 5 of the 7 drags. The young-of-the-year catch consisted of 291 white bass, 3 northern pike, 3 white crappie, 1 drum, and 1 channel catfish.

Zone 6: The 18 drags in Zone 6 caught 2,031 fish, age group II or older, that weighed a total of 2,462 pounds, for an average of 113 fish or 137 pounds per drag. The dominant species taken was carp (53.2 percent by number and 73.5 percent by weight). The catch of carp was made up of 96 percent small fish (age groups II and III) and 4 percent large fish (age group IV and older). The average weight of small carp was 1.6 pounds and of large carp 3.9 pounds.

The most productive drag in Zone 6 produced 223 fish that weighed 335 pounds. Carp comprised 87 percent by weight of the fish taken in that drag.

The catch of 615 yearling fish in Zone 6 was dominated by goldeye (408 fish) and crappie (108 fish). Other yearlings taken were 36 channel catfish, 30 white bass, 16 sauger, 8 drum, 5 northern pike, 2 carpsucker, 1 white sucker, and 1 carp.

Young-of-the-year fish were taken in all drags in Zone 6. Crappie and white bass dominated the young catch. Of 1,683 young-of-the-year taken, crappie (white and black combined) made up 75 percent and white bass 20 percent. Other young taken included carp, goldeye, sauger, black bullhead, drum, big-mouth buffalo, and perch.

Note: See Commercial Fisheries Review, Dec. 1965 p. 37, Nov. 1965 p. 24.



Inventions

NEW FISHERY PROCESSING METHODS PATENTED:

Following are brief descriptions of patented devices and methods for processing fishery products, as reported in Food Technology, September 1965:

Scallop Evisceration: L. C. Renfro issued U. S. Patent No. 3,177,522, April 13, 1965: Automated apparatus for severing the viscera of scallops in a manner to permit the scallop muscle to rotate about its own axis when the viscera attached to the muscle

is engaged by the leading edge of a cutting element.

Shrimp Deveining: T. S. Gorton, Jr., Riverside Inc., issued U. S. Patent No. 3,178,765, April 20, 1965: A hand instrument for deveining and removing the shells of shrimp.

Tuna Packer: E. H. Carruthers issued U. S. Patent No. 3,181,957, May 4, 1965: A fish-packing method in which fish loins of the required weight for a single container are broken into pieces and reformed into a chunk pack by pressure, thus retaining their chunk appearance.

Fish Processing: S. H. Lassen, Ralston Purina Co., issued U. S. Patent No. 3,180,738, April 27, 1965: Cooked tuna-like fish are cooled preparatory to canning in an atmosphere of inert gas.

NEW FISHING TACKLE DEVICE PATENTED:

The inventor of a new fishing tackle device describes it as a multibait device that is not easily tangled and which is especially useful to keep live bait separated but active while fishing. Includes a (colored) translucent plastic tubular body having a number of leaders with hooks extending transversely--thereby eliminating separate floats, weights, and swivels, yet retaining their general functions. It has a simple device by which varying amounts of air may be trapped in the tubular body to vary the buoyancy of the device and keep it upright in the water. Since the bait, hooks, and tubular body are thus compactly arranged at the end of the fishing line, the device may be easily cast and successfully used even by inexperienced fishermen. (Pat. No. 3,183,620 granted Emil J. Dockal, 8606 Kellett, Houston, Tex. 77028.)



Marketing

EDIBLE FISHERY PRODUCTS, JANUARY-AUGUST 1965 AND OUTLOOK FOR 1966:

Total supplies in the United States of edible fishery products during the first 8



Attractive fresh fish display.

months of 1965 were just above those of a year earlier. The status of frozen stocks changed only little. But landings of major edible species ran about 3 percent below 1964, with haddock, salmon, tuna, Pacific mackerel, and ocean perch landings well below the previous year. Shrimp was the only major species with a considerable gain.

The lower landings during the period were offset by a 7-percent increase in imports of edible fish, due mainly to a large increase in frozen fish blocks and slabs and frozen shrimp. At the beginning of 1965, it appeared that a shortage of fish blocks might cut down production of fish sticks and portions. United States imports of frozen fish blocks increased during the 8-month period and supplies were expected to be ample at the start of the new year.

The small increase in fishery products supplies is not keeping pace with population growth. United States per capita consumption of fishery products in 1965 was about 10.5 pounds compared with 10.6 pounds in 1964. Consumption of fresh and frozen fishery products was estimated at 5.8 pounds per capita, down from 5.9 pounds; for canned fishery products it was unchanged at 4.2 pounds, and also unchanged for cured products at 0.5 pound.

With slightly lower fishery products supplies per capita and increased prices of competing products, retail prices for fishery products as of November 1965 averaged above a year earlier. Prices strengthened in the fourth quarter of 1964 and continued an upward trend in the first 3 quarters of 1965. Prices in 1965 averaged above 1964 by about 3 percent, halting a 2-year downward trend.

No appreciable change in United States supplies is expected for 1966, although some increase appears likely. High prices in 1965 may stimulate a little more fishing effort by the fishing fleet. Higher prices, however, are more likely to result in increased imports.

Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the U. S. Department of Agriculture's November 1965 issue of the National Food Situation (NFS-114).



North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, NOVEMBER 1965:

Soviet fishing activity in the North Atlantic during November 1965 declined to its lowest level since the beginning of 1965. It was estimated that the total number of vessels during the month did not exceed 25. Of those, 16 were identified as 12 fish-factory stern trawlers, 3 processing and refrigerated-factory stern trawlers, and 1 refrigerated fish transport. This compared with 74 vessels sighted in October of this year and 26 in November 1964.

The observations were made by the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts weekly reconnaissance flights cooperatively with the U. S. Coast Guard. Weekly sightings to about mid-November averaged about 5 vessels; by the end of the month they rose to 20 vessels.

Their fishing operations were widely scattered over a 50-mile area from the Cultivator Shoals to the "southeast part" of Georges



Fig. 1 - Rumanian factory stern trawler Constanta on Georges Bank during October 1965.

Bank, 60 miles east to 140 miles southeast of Cape Cod, at depths of 30 to 50 fathoms. Despite gale force winds which prevailed during most of November, the majority of vessels were actively engaged in fishing operations, with the moderate to small catches observed on deck mostly whiting. Because of the limited number of vessels scattered over the banks it was presumed they were acting as scout vessels in search of fish concentrations.



Fig. 2 - Polish factory stern trawler Finwal was fishing on Georges Bank in October 1965.

The decrease in Soviet fishing activity in November was not limited to Georges Bank only. A gradual decline in activity off the eastern Nova Scotian areas was also observed during the month.

Note: See Commercial Fisheries Review, December 1965 p. 40.



North Atlantic Fisheries Investigations

LOBSTER AND SEA HERRING POPULATION STUDIES CONTINUED:

M/V "Delaware" Cruise 65-12 (Lobster Investigations, October 28-November 2; Her-

ring Investigations, November 3-8, 1965): To sample lobster and sea herring populations in the North Atlantic Ocean (Hudson Canyon, southeast part and northern part of Georges Bank) was the principal objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Delaware. Other objectives were to: (1) obtain related environmental data, (2) obtain lobster and herring blood samples, and (3) make plankton tows for lobster and herring larvae.

FISHING OPERATIONS: Lobster: Six trawl sets made at the station worked in waters of 45 fathoms yielded 140 lobsters--77 females (6 berried) and 63 males. Two lobsters (males) were soft-shelled. The average weight of the lobsters was $1\frac{1}{2}$ pounds and the range in weight was from $\frac{1}{2}$ to $6\frac{1}{2}$ pounds. A total of 25 lobster blood samples was obtained for analysis.

Herring: Seven herring trawl sets were made at stations covered. The sets made in waters of 40 to 62 fathoms yielded a total of 12 bushels (about 850 pounds) of herring ranging from 24.5 to 33.2 centimeters (about 9.6 to 13.0 inches) long. The 1960 year-class was dominant in the herring catches, followed in percentage occurrence by the 1961 year-class. Examination showed that the majority of the herring had spawned. A total of 30 blood samples was obtained for analysis. Other species of fish caught during the cruise were: haddock (23 bushels), hake (14 bushels), pollock (2 bushels), cod ($1\frac{1}{2}$ bushels), anglerfish (1 bushel), whiting ($\frac{1}{2}$ bushel), butterfish ($\frac{1}{2}$ bushel), lemon sole ($\frac{1}{4}$ bushel), dab ($\frac{1}{4}$ bushel), and 1 halibut.

PLANKTON OPERATIONS: Lobster: One 1-meter net plankton tow lasting 15 minutes (at the surface) was made during the cruise but no lobster larvae were obtained. **Herring:** Fourteen 1-meter net plankton tows lasting 15 minutes each (5 minutes at 10 meters, 5 minutes at 5 meters, and 5 minutes at the surface) were made during the cruise. Herring larvae with an average length of 19 millimeters (0.7 inches, range 0.4 to 1.1 inches) totaled 72.

HYDROGRAPHIC OBSERVATIONS: Sea-bed drifters and drift bottles were released at various stations and at each hydrographic station bathythermograph (BT) casts were made, surface salinities collected, and weather observations recorded.

Note: See Commercial Fisheries Review, December 1965 p. 41.

FALL DISTRIBUTION OF LARVAL HERRING IN GULF OF MAINE STUDIED:

M/V "Rorqual" Cruise R-6-65 and R-7-65 (October 20-28 and November 1-10, 1965): To determine the fall distribution and relative abundance of larval herring in the Gulf of Maine and to examine their microdistribution with special emphasis on dispersion was the objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Rorqual. The area where the vessel operated was from Cape Ann to Grand Manan Channel and inshore within Casco Bay, Sheepscot and Damariscotta estuaries.

BIOLOGICAL OBSERVATIONS: Oblique tows with a Gulf III sampler were made from the surface to 20 meters (65.6 feet) at most of the stations worked. At a number of stations, tows were made at the surface, mid-depth, and bottom. Four transects of the standard tow of 3 miles were run--2 with the BB #1 trawl equipped with a fine-mesh liner and 2 with the Gulf III sampler. Each 3-mile tow was repeated as two 1½ mile tows and again as four ¾-mile tows. The length of transects were: Casco Bay 3 miles, New Meadows River 6 miles, Sheepscot River 6 miles, and Damariscove Island 9 miles. Paired tows using the Gulf III and BB #1 trawl were made in the Sheepscot and Damariscotta estuaries. Buoy nets were set overnight in the Sheepscot estuary.

PRELIMINARY FINDINGS: Large catches (110 to 422) of herring larvae were made near Cape Porpoise and offshore of the Saco Bay area and good catches (34) were made in Saco Bay and Casco Bay. Two weeks later catches in that same area were very small. Other fluctuations in larval abundance occurred in Casco Bay where two catches on one day of 36 larvae with the trawl was reduced to only a few larvae on the following day. Off Damariscove Island an abundance of larvae was found on November 8 and 36 hours later only a single larvae was taken at the same station.

A hydrographic station was occupied at 12 continuity stations and surface salinometer measurements were obtained at all other stations.

Note: See Commercial Fisheries Review, September 1965 p. 38; February 1965 p. 35.



North Pacific Fisheries Explorations and Gear Development

MODIFIED PELAGIC TRAWLS TESTED:

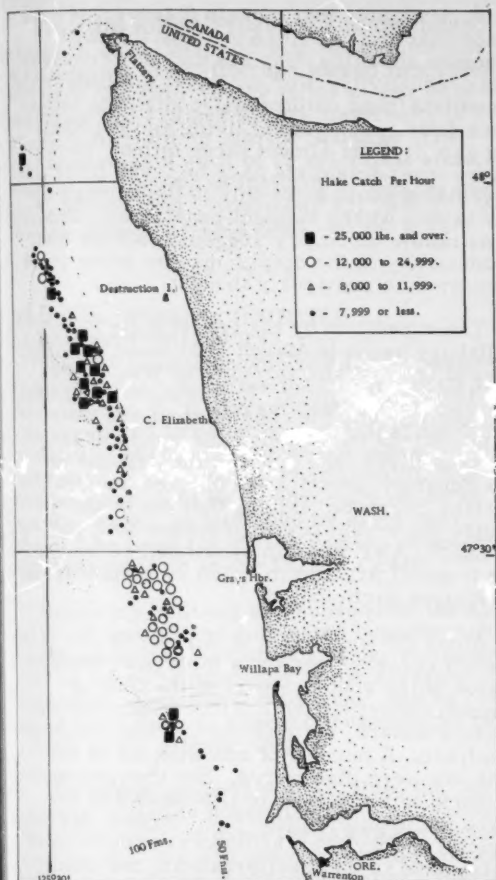
M/V "Western Flyer" Cruise 6 (July 16-October 22, 1965): To determine the commercial production potential of Pacific hake (*Merluccius productus*) when fished with experimental "Cobb" pelagic trawls and accessory equipment was the primary objective of this 99-day cruise off the Washington coast. The exploratory fishing vessel Western Flyer was chartered for that purpose by the U. S. Bureau of Commercial Fisheries. Other objectives included the collection of related data such as: (1) economic factors related to commercial exploitation; (2) ruggedness and reliability of experimental gear; (3) catch rates in time and space; (4) analysis of catching technique and fishing methodology; and (5) relative effectiveness of various loading and unloading methods and procedures.

AREA OF OPERATIONS: Fishing was conducted along the coast of Washington from Cape Flattery to the Columbia River. Major areas of hake concentrations were found off Willapa Bay, Grays Harbor, Cape Elizabeth, and Destruction Island. Bottom depths ranged from 30 to 100 fathoms, although most drags were made between the 50- and 65-fathom contours. Hake were usually found from 2 to 10 fathoms off the bottom.

All fish caught during the cruise were delivered to a reduction plant at Warrenton, Oreg. (near the mouth of the Columbia River).

EQUIPMENT: The Western Flyer is a 70-foot seine-type vessel powered by a 290-hp. engine and was operated with a four-man crew. Deck machinery includes separate drum trawl winches, trawl-net reel, and dual hoists--all hydraulically operated. The vessel's hold is fitted with a watertight aluminum tank for holding live king crab. Calculated capacity of the tank is about 65 tons.

Fishing on this cruise was conducted with "Cobb" pelagic trawls constructed of either conventional multifilament or ribbon-type monofilament webbing. A dual unit depth telemetry system with electrical core towing cables provided depth readings at each hydrofoil-type otter board. A patented closing device (Holland clip) was used in place of the conventional "hangmen's" knot to secure the cod end of the net.



Areas of explorations during M/V Western Flyer Cruise 6 (July 16-October 22, 1965).

AVAILABILITY OF FISH: On the basis of 1964 exploratory fishing, it was expected that large schools of hake would be available within a short running distance of the Columbia River. In contrast, no large concentrations of hake were found in that area although it had repeatedly been surveyed by the Western Flyer, another chartered vessel the St. Michael, and the Bureau's exploratory fishing vessel John N. Cobb. Low availability of fish may have been due to unusually high water temperatures along the Washington and Oregon coasts.

Occasional good catches were made on small isolated schools of fish along the central and northern coast of Washington. Schools

seemed to disperse rapidly, making it difficult to set back on the same school of fish. Eleven days of the cruise were spent seeking scattered schools of hake.

CATCHES: A total of 170 drags made during the cruise yielded 872 tons of fish, with the largest single catch 60,000 pounds. Catches exceeding 25,000 pounds an hour were made during 13 tows. Twenty-seven tows had catches ranging between 12,000 and 25,000 pounds an hour. Twenty-seven tows yielded catches ranging between 8,000 and 12,000 pounds an hour, and 90 tows were made having catches below 8,000 pounds an hour. A total of 13 tows had no significant catch. The length of time for each tow varied but was usually about 60 minutes.

GEAR PERFORMANCE: Very few difficulties were experienced while using the experimental nets, cable, and depth telemetry system. The gear was operated by commercial fishermen under production conditions and found to be suitable for sustained fishing.

No significant difficulties developed in transferring fish from the net to the hold. The "Holland clip," a patented cod-end closing device, aided greatly in rapid splitting of 1-ton lifts directly from the water into the hold. About 1,000 pounds of hake a minute were loaded.

At first it was necessary to unload catches from the Western Flyer using pitchforks and tubs. Later, a pump was installed at the reduction plant which successfully removed the fish after numerous mechanical difficulties were overcome. About 8 hours were required to remove fish by hand whereas the pumping operation was completed in about 4 hours.

Severe gilling of hake occurred at times in the 3-inch trawl body web. The average size of hake taken in 1964 was 54 centimeters (21.3 inches) whereas in 1965 it was 52 centimeters (20.5 inches). During several trips in 1965 the average length was only 48 centimeters (18.9 inches).

A comparison of catch rates per drag made by two types of "Cobb" pelagic trawls appeared significant. A total of 135 drags made with the conventional multifilament net yielded 1,062,270 pounds of fish for an average yield of 7,870 pounds per drag. Thirty-five drags with the monofilament net yielded

436,630 pounds for an average catch of 12,480 pounds per drag--about 60 percent more effective (preliminary evaluation).

WEATHER: The weather was good during the first 80 days of the cruise. But unfavorable conditions of the Columbia River bar often delayed the vessel's arrival in port by several hours. On one occasion a 10-ton deckload was swept overboard.

About 62 days of the cruise were actually spent at sea hunting and fishing hake. The remaining 37 days were lost to unloading, bad weather, mechanical failures on the vessel, and other disruptions.

CONCLUSIONS: (1) Availability of hake in 1965 was less than in 1964; (2) electric towing cable for telemetry on commercial fishing vessels is feasible; (3) on the basis of a available data, the "Cobb" pelagic trawl may be more effective when constructed of monofilament webbing; (4) hake can be held for 3 days without ice or refrigeration and processed successfully; (5) the "Holland clip" aids materially when splitting fish aboard; (6) the after portion of a commercial "Cobb" pelagic trawl body should be constructed of $2\frac{1}{2}$ " 24-thread web to reduce damage from gilling and fish teeth; (7) vessel hold should have an effective sump pump to remove excess water taken aboard with fish; (8) a 290-hp. engine cannot control the "Cobb" pelagic trawl in strong cross tides; (9) the hold must be watertight to prevent odors from passing forward in the bilge.

Note: See *Commercial Fisheries Review*, October 1965 p. 44; September 1965 p. 40.



Oceanography

RESEARCH VESSEL "JOHN ELLIOTT PILLSBURY" COMPLETES 8-MONTH EXPEDITION:

A 23,500-mile 8-month oceanographic research expedition in the Atlantic Ocean, the Mediterranean, and the Baltic and Black Seas by the research vessel John Elliott Pillsbury ended November 15, 1965. The 176-foot vessel is operated by the Institute of Marine Science, University of Miami, Miami, Fla.

It will take many months to compile and evaluate the scientific data obtained on this important expedition, the Institute director

said. He states that certain discoveries were made that may overturn well-established theories about the deep sea and its processes and productivity. For example, the Institute's scientists found chlorophyll-containing organisms (tiny green plants) living and reproducing at a depth of almost three miles. Heretofore most scientists have believed that such organisms could exist only in the ocean's upper layers where sunlight penetrates. This remarkable discovery suggests that the total productivity of the oceans may be many times greater than previously thought.

The expedition by the vessel John Elliott Pillsbury began in March 1965 when she proceeded from Miami through the West Indies and to South America. Following studies of productivity and the chemistry of sea water in the Guiana basin and at the mouth of the Amazon River, she crossed the Atlantic at the Equator, investigating surface and subsurface currents. During that leg of the cruise the vessel oceanographers took part in EQUALANT V, an international survey of the tropical Atlantic in which scientists from 11 nations participated.

Along the west coast of Africa the research vessel conducted a biological investigation of the southern part of the Gulf of Guinea, collecting fish and invertebrates from surface waters, the mid-depths, and the deep-sea floor. A number of new species of marine life were discovered. She then proceeded north to the Straits of Gibraltar and entered the Mediterranean Sea. Extensive geological, geophysical, and geochemical studies were made in the Mediterranean, the Baltic, and the Black Seas. Submarine volcanoes were investigated and studies of deep-sea sediments, currents, and bottom topography carried out. In the Black Sea, deep-sea photographs were obtained of dead fish lying intact on the bottom where they had sunk from surface waters. Because of the lack of oxygen in the deep water of the Black Sea, the bodies of surface animals that sink do not decompose in the usual manner. The bottom sediments of the Black Sea were studied for clues to the origin of petroleum about which very little is known.

The return trip of the vessel was westward across the Atlantic, from the Straits of Gibraltar and on to her home base in Miami. On this leg she conducted coring and dredging operations.

The John Elliott Pillsbury was commissioned in July 1963, and with the completion of this latest expedition has logged more than 500 days and over 73,000 miles at sea on expeditions and cruises for the University of Miami's Institute of Marine Science. The vessel carries a staff of 13 scientists and a crew of 21. (News of Institute of Marine Science, Miami, Fla., November 11, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 41.

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NEW U. S. RESEARCH VESSEL READY FOR DELIVERY:

The new oceanographic research vessel Oceanographer, built for the Coast and Geodetic Survey, U. S. Department of Commerce, was scheduled to be delivered to that agency in January 1966. The 3,800-ton vessel, built and outfitted at a cost of \$7 million, is 303 feet long and is to be permanently based at Seattle, Wash., in late 1966 or early 1967. She will be used for a wide variety of oceanographic surveys in the Pacific Ocean.

Following delivery and subsequent installation of specialized automated oceanographic instrumentation, the Oceanographer will probably be based temporarily in the Jacksonville, Fla., area for about a year, during which time she will conduct oceanographic research in the Atlantic Ocean.

The Oceanographer's sistership, the Discoverer, which is scheduled to be delivered later this year, is expected to remain on the East Coast. She will also be berthed for perhaps a year in the Jacksonville area. Both vessels were built at a Jacksonville shipyard and it was necessary to base them near the construction site during the "shakedown" period which follows delivery.

Each vessel will have a cruising range of 16,000 miles and will carry a normal complement of 13 officers, a crew of 39, and 45 technical and scientific personnel, with additional accommodations for 8 visiting scientists. All scientific working areas will be air-conditioned with interconnecting communications. Closed circuit television will be provided throughout the engineroom, where a centralized control system will provide remote starting and stopping of machinery, programming of the fuel and ballast system, and the automatic recording of operating data at a master control station.

Another feature will be a center well running vertically through each vessel which will enable special experimental equipment to be lowered and SCUBA divers to enter and leave the vessel. Special bow-viewing ports below the water line will permit underwater observations. Laboratory space of over 4,100 square feet will be provided. (U. S. Coast and Geodetic Survey, November 12, 1965.)

Note: See Commercial Fisheries Review, June 1964 p. 23.



Oregon

WILLAMETTE RIVER SPRING CHINOOK SALMON RETURNS FOR 1965:

A record number of adult spring chinook salmon arrived at the Oregon Fish Commission's Dexter Dam trapping facility on the Middle Willamette River east of Eugene during the 1965 season, according to the Commission's fish culture director. Some 6,600 chinook were counted into the holding ponds at Dexter compared with 5,100 during the 1964 season and 6,000 in 1963. Observations by hatchery personnel were that there was a substantial spawning population in the river below Dexter, probably at least as many as the previous year when about 1,000 spawners were counted during a check by helicopter.

At Minto Pond below the Detroit Dam on the North Santiam River, where spring chinook are taken primarily to supply eggs for the Marion Forks Hatchery, the take of 1,900 adults was lower in 1965 than in both 1963 and 1964 when 2,900 and 2,600, respectively, were counted, but still ranked fifth in the number of fish during the 15 seasons since the dam was constructed. The Minto trap was out of operation until September 1, 1965, because of repairs to the water supply diversion dam at the site. Ordinarily the trap would have been operating from May into the fall months to take spring chinook moving up-river. The fish stayed in the river during the summer since they were unable to enter the trap. It was considered doubtful that this had any effect on the number of fish handled at Minto.

The Marion Forks egg harvest in 1965 was considered excellent, with 5.6 million eggs taken compared with 4.9 million in 1964. The average egg take at that station during the past 10 years has been 2.6 million. The 1965 egg harvest at Dexter was also excel-

lent, with the season's total at 9.6 million eggs. This exceeded the previous year's 9.4 million but was below the 12 million egg take in 1963. The average egg harvest at Dexter over the past 10 years has been 3.9 million. There was a substantial loss of fish from "Columnaris" at Dexter, with about 1,200 adults succumbing to the effects of that disease. It was estimated that the reduction in the egg take caused by these mortalities was 3.5 million.

Despite the good hatchery showing, the 1965 run of spring chinook in the Willamette was calculated at 41,000 fish, about 9,000 below the average of the past 20 years; but in 7 of those 20 seasons there have been smaller runs with a low of 24,800 fish in 1950. Sport fishermen landed about 9,000 chinook during the 1965 season, down about one-quarter from the 20-year average catch of 12,000 fish. This catch by sport fishermen was 22 percent of the run compared to the 20-year average of 27 percent. The Willamette Falls count was 29,000 compared with the 20-year average of 36,000.

The Willamette spring chinook run is not harvested to any extent by the commercial fishery in the Columbia River since the peak of that run passes up the Columbia and into the Willamette between the winter and spring gill-net seasons.

Hatcheries operated by the Oregon Fish Commission on the Willamette River system, including the Willamette, McKenzie, South Santiam, and Marion Forks stations have a combined rearing capacity of 7 million spring chinook yearlings. So far, some 4.5 million spring chinook eggs have been transferred to the U. S. Fish and Wildlife Service for rearing at the Eagle Creek National Fish Hatchery in the Clackamas River drainage, and transfer to other Federal hatcheries in the Columbia River Basin. Over 10 million additional eggs remain in Commission hatcheries to be used in the rearing program or for research studies associated with new dams on Willamette tributaries.

About 30 percent of the chinook salmon passing over Willamette Falls in spring 1965 eventually were handled at Commission holding ponds indicating the substantial contribution the hatcheries are making in maintaining the Willamette River run. (Oregon Fish Commission, November 1, 1965.)

SURPLUS SILVER SALMON FROM COASTAL HATCHERIES USED TO SEED OTHER WATERS:

In the fall of 1965, most Oregon State fish hatcheries in the coastal area were receiving a surplus of silver salmon spawners. The excess salmon were replanted in streams which can support larger salmon runs. The Oregon State Fish Commission hatchery director emphasized that sufficient fish are allowed to escape upstream beyond hatchery racks to take full advantage of whatever natural spawning area is available. Only after both hatchery and natural spawning area needs are taken care of are fish hauled to other waters, the hatchery director stated. (Oregon State Fish Commission, November 17, 1965.)



Salmon

U. S. PACIFIC COAST CANNED STOCKS, NOVEMBER 1, 1965, AND NEW SEASON PACK:

On November 1, 1965, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 2,614,869 standard cases (48 1-lb. cans)--757,344 cases less than on November 1, 1964, when stocks totaled 3,372,213 standard cases.

On the basis of total stocks of 3,478,830 actual cases (consisting of cans of $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., etc.), red salmon accounted for 1,938,736 cases (mostly 1-lb. and $\frac{1}{2}$ -lb. cans) or 57.0 percent of the total canners' stocks on November 1, 1965; pink salmon accounted for 793,674 cases or only 22.8 percent (546,934 cases were 1-lb. talls). Next came chum (328,219 cases, mostly 1-lb. talls), followed by coho or silver (232,458 cases), and king salmon (140,743 cases).

Table 1 - Total Canners' Stocks of Pacific Canned Salmon, November 1, 1965

Species	Nov. 1, 1965	July 1, 1965	Nov. 1, 1964
 (No. of Actual Cases)		
King	140,743	24,850	104,399
Red	1,983,736	109,129	750,483
Coho	232,458	62,709	250,162
Pink	793,674	399,169	2,109,841
Chum	328,219	262,259	817,515
Total	3,478,830	858,116	4,132,400

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965, the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Table 2 - Total Cannery Stocks on Hand November 1, 1965 (Sold and Unsold), By Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 1/4-lb.	7,795	274,249	77,739	4,515	67	364,365
48 1/2-lb.	116,088	696,677	90,534	214,269	63,806	1,181,374
48 1-lb.	16,187	1,008,590	52,907	546,934	252,561	1,877,179
12 4-lb.	573	4,220	11,278	27,956	11,785	55,912
Total	140,712	1,983,736	232,458	793,674	328,219	3,478,830

Table 3 - Cannery Shipments from July 1, 1965, to November 1, 1965, By Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 1/4-lb.	6,405	150,799	47,099	3,978	-	208,281
48 1/2-lb.	52,764	286,338	42,014	198,071	30,286	609,473
48 1-lb.	4,544	452,033	55,193	502,703	245,982	1,260,455
12 4-lb.	418	5,239	2,991	29,983	4,836	42,631
Total	63,295	894,409	147,297	734,735	281,104	2,120,840

Table 4 - Pacific Canned Salmon Pack by Species and Can Size, 1965

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(No. of Actual Cases)					
48 1/4-lb.	12,451	391,848	116,056	7,378	45	527,778
48 1/2-lb.	148,693	924,106	119,880	334,036	72,351	1,609,066
48 1-lb.	17,875	1,443,614	68,314	723,541	267,060	2,520,404
12 4-lb.	169	9,448	12,796	54,285	7,608	84,306
Total	179,188	2,769,016	317,046	1,129,240	347,064	4,741,554

Shipments at the cannery level of all salmon species from July 1 to November 1, 1965, totaled 1,659,839 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 95,503 standard cases (78,155); red, 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 94 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Cannery Association, December 1, 1965.)

Note: See *Commercial Fisheries Review*, Sept. 1965 p. 41.



Shrimp

BREADED PRODUCTION, JULY-SEPTEMBER 1965:

United States production of breaded shrimp during the third quarter of 1965 amounted to about 21.0 million pounds -- a decrease of about

Table 1 - U. S. Production of Breaded Shrimp by Areas, July-September 1965

Area	1/July-Sept. 1965		July-Sept. 1964	
	No. Plants	Quantity 1,000 Lbs.	No. Plants	Quantity 1,000 Lbs.
Atlantic	15	6,542	14	7,936
Gulf	16	12,809	21	13,790
Pacific	8	1,615	8	2,044
Total ...	39	20,966	43	23,770
1/ Preliminary.				

Table 2 - U. S. Production of Breaded Shrimp by Months, 1964-65

Month	1/1965	1964
	.. (1,000 Lbs.) ..	
January	6,926	7,347
February	6,632	8,045
March	7,771	7,249
April	6,120	7,027
May	6,023	6,171
June	5,855	6,588
July	5,410	8,641
August	7,255	7,299
September	7,301	7,830
October	-	9,169
November	-	7,852
December	-	7,460
Total	-	90,678
1/ Preliminary.		

2.8 million pounds or 11.8 percent as compared with the same period in 1964.

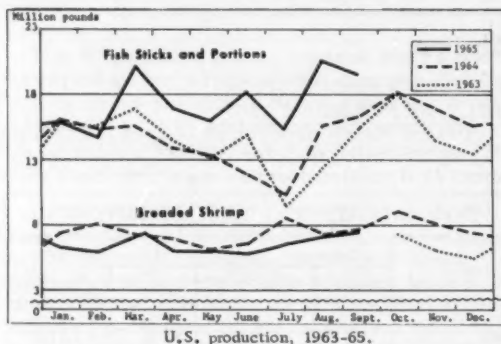
The Gulf States ranked first in the production of breaded shrimp with 12.8 million pounds, followed by the Atlantic States with 6.5 million pounds, and the Pacific States with 1.6 million pounds.



United States Fisheries

FISH STICKS AND PORTIONS, JULY-SEPTEMBER 1965:

United States production of fish sticks and fish portions amounted to 55.6 million pounds during the third quarter of 1965, according to preliminary data. Compared with the same quarter of 1964, this was an increase of 13.4 million pounds or 31.6 percent. Fish portions (36.5 million pounds) were up 10.8 million pounds or 42.2 percent, and fish sticks (19.1 million pounds) were up 15.3 percent.



Cooked fish sticks (17.8 million pounds) made up 93.2 percent of the July-September 1965 fish stick total. There were 36.0 million pounds of breaded fish portions produced, of which 27.6 million pounds were raw. Unbreaded fish portions amounted to 453,000 pounds.

Table 1 - U. S. Production of Fish Sticks by Months and Type, July-September 1965 1/

Month (1,000 Lbs.)		
	Cooked	Raw	Total
July	4,883	414	5,297
August	6,147	380	6,527
September	6,784	509	7,293
Total 3rd Qtr. 1965 1/.....	17,814	1,303	19,117
Total 3rd Qtr. 1964 2/.....	15,017	1,570	16,587
Total 1964 2/.....	67,810	5,722	73,532

1/ Preliminary.
2/ Revised.

Table 2 - U. S. Production of Fish Portions by Months and Types, July-September 1965 1/

Month (1,000 Lbs.)			Un-breaded	Total
	Cooked	Raw	Total		
July	2,010	7,861	9,871	101	9,972
August	3,310	10,561	13,871	121	13,992
September	3,116	9,173	12,289	231	12,520
Tot. 3rd Qtr. 1965 1/.....	8,436	27,595	36,031	453	36,484
Tot. 3rd Qtr. 1964 2/.....	5,029	20,140	25,169	489	25,658
Total 1964 2/.....	20,956	82,135	103,091	2,541	105,632

1/ Preliminary.
2/ Revised.

The Atlantic States continued to lead in the production of both fish sticks and fish portions, with 14.9 and 22.6 million pounds, respectively. The Inland and Gulf States ranked second with 2.3 million pounds of fish sticks and 13.2 million pounds of fish portions.

NATIONAL ANADROMOUS FISHERY PROGRAM ACT:

Far-reaching benefits to the Nation's sport and commercial fisheries will result from legislation recently signed into law by President Johnson, announced Secretary of the Interior Stewart L. Udall on November 18, 1965. Public Law 89-304, the National Anadromous Fishery Program Act, authorizes cooperative projects between the Federal Government and the various States to conserve and enhance the United States fisheries for salmon, shad, striped bass, and other anadromous fish that live in the sea or Great Lakes, and migrate up streams to spawn.

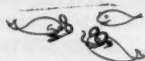
The Act authorizes future appropriations not to exceed \$25 million for the period ending June 30, 1970. Not more than \$1 million can be obligated in any one fiscal year in any one State. Funds for financing the cooperative program have yet to be appropriated by Congress.

Projects authorized under the law include investigations and research into anadromous fish problems "as may be desirable to carry out the program." These include (1) improving access to spawning areas; (2) construction and operation of facilities to improve feeding and spawning conditions; (3) improving facilities for free migration of fish; and (4) construction and operation of fish hatcheries.

Work under the anadromous fish program will be covered by agreements between the

Secretary of the Interior and a State or several States acting jointly. The agreements will describe the actions to be taken by the cooperating agencies, benefits expected, estimated costs, the Federal share of the costs which cannot exceed 50 percent of the total, duration of the agreement, and conditions for disposing of any property acquired by the Secretary following termination of the project.

Representatives of the Department of the Interior in the near future will confer with directors of State fish and game departments concerning proposed cooperative agreements, the Interior Secretary said.



U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, JULY 1965:

During July 1965 a total of 53 vessels of 5 net tons and over was issued first documents as fishing craft as compared with 56 in July 1964. There were 35 documents cancelled for fishing vessels in July 1965 as compared with 41 in July 1964.

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, July 1965 with Comparisons				
Area (Line Port)	July		Jan.-July	
	1965	1964	1965	1964
Issued first documents 2/:				
.....(Number).....				
New England.....	6	5	23	24
Middle Atlantic.....	-	-	7	5
Chesapeake.....	3	1	21	24
South Atlantic.....	6	5	43	30
Gulf.....	23	22	167	142
Pacific.....	15	23	128	103
Great Lakes.....	-	-	1	1
Hawaii.....	-	-	-	-
Puerto Rico.....	-	-	1	1
Total.....	53	56	391	331
Removed from documentation 3/:				
New England.....	1	9	24	26
Middle Atlantic.....	-	3	11	15
Chesapeake.....	4	3	22	20
South Atlantic.....	3	1	46	25
Gulf.....	16	5	70	59
Pacific.....	10	20	57	102
Great Lakes.....	1	-	10	9
Hawaii.....	-	-	2	-
Puerto Rico.....	-	-	1	-
Total.....	35	41	243	256

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

2/There were 6 undocumented vessels in July 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 36 in 1965; 1 in 1961; 1 in 1960; 1 in 1956; and 14 prior to 1948.

3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Sources: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U.S. Treasury Department.

U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-October 30, 1965, amounted to 37,954,445 pounds (about 1,808,200 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 2.1 percent from the 37,162,653 pounds (about 1,769,650 standard cases) imported during January 1-October 31, 1964.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty is limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

TRENDS IN UNITED STATES EXPORTS OF FISHERY PRODUCTS, 1964:

In 1964, the value of United States exports of fishery products totaled \$64,204,000--a 13-percent increase over the previous year and a record high for the export of fishery products. The value of fishery exports in 1964 was 63 percent higher than the average of the previous ten years. In 1964, canned salmon replaced fish oil as the principal fishery product exported by the United States.

Table 1 - Value of United States Exports of Fishery Products, 1954-1964

Year	Edible	Inedible (US\$1,000)	Total
1964	42, 878	21, 320	64, 204
1963	30, 376	26, 229	56, 605
1962	22, 470	13, 258	35, 728
1961	19, 594	15, 116	34, 710
1960	25, 622	18, 543	44, 165
1959	26, 747	17, 495	44, 242
1958	19, 440	11, 564	31, 004
1957	20, 549	15, 403	35, 952
1956	22, 939	16, 564	39, 503
1955	24, 923	15, 054	39, 977
1954	16, 238	15, 289	31, 527

Trends by Countries: U. S. fishery products are marketed in well over 100 countries throughout the world. The United Kingdom, Canada, and Japan buy over half of U. S. exports of fishery products. In 1964, eleven countries each received U. S. fishery exports valued over US\$1.0 million. Together the eleven countries accounted for 87 percent of total U. S. exports of fishery products.

Table 2 - United States Exports of Fishery Products by Selected Countries of Destination, 1960-1964

Country	1964	1963	1962	1961	1960
	(US\$1,000)				
United Kingdom	15,102	13,081	8,249	4,554	8,460
Canada	10,434	11,156	8,846	10,265	10,309
Japan	9,200	7,819	939	2,984	3,295
Sweden	6,425	4,473	1,076	1,665	2,613
Netherlands	4,879	2,593	2,273	2,385	4,350
West Germany	3,146	3,638	1,467	1,555	2,201
France	2,325	1,889	1,073	1,007	1,048
Switzerland	1,284	2,229	1,712	738	1,082
Belgium	1,115	445	547	351	537
Norway	1,064	1,539	403	2,390	1,390
Philippines	1,043	403	320	582	2,494
Italy	656	1,643	869	423	643
Hong Kong	603	388	383	368	269
Greece	471	566	487	364	313
Australia	426	203	198	458	444
Mexico	417	263	375	459	616
Venezuela	238	183	274	360	461
Ecuador	39	1	171	82	293
Other	5,337	4,094	6,066	3,720	3,347
Total	64,204	56,606	35,728	34,710	44,165

UNITED KINGDOM: Exports of fishery products to the United Kingdom have increased steadily since 1961. For the second year in a row the United Kingdom was the leading export market for U.S. fishery products. Exports of fish oil practically ceased in 1964. However, this decrease was offset by the 92-percent increase in exports of canned salmon and the 52-percent increase in exports of fresh and frozen salmon. The major fishery commodities exported to the United Kingdom were:

Commodity	1964	1963
	(US\$1,000)	
Fish and marine-animal oil	214	5,142
Salmon, canned	11,559	6,006
Salmon, fresh or frozen	1,178	777
Shrimp, canned	1,116	798
Other	1,035	358
Total	15,102	13,081

CANADA: In 1964, Canada (traditionally the major market for exports of U.S. fishery products) remained in second place as an export market. The value of fishery products exported to Canada declined 6 percent from the previous year. The principal items exported to Canada were:

Commodity	1964	1963
	(US\$1,000)	
Shrimp, fresh or frozen	2,214	2,165
Shrimp, canned	1,847	1,592
Seal furs	2,004	1,935
Fish, fresh or frozen	1,001	1,043
Canned fish	124	1,002
Fish, shellfish and other marine-animal products, inedible	589	879
Fish, marine-animal, and liver oil	73	543
Salmon, fresh or frozen	547	581
Other	2,035	1,416
Total	10,434	11,156

OTHER COUNTRIES: The values of the principal fishery products exported in 1964 to other major markets were:

Country & Product	US\$1,000
Japan:	
shells, unmanufactured	1,487
shrimp, frozen	4,304
salmon, fresh or frozen	1,947
Sweden, fish oil	5,901
Netherlands, fish oil	2,853
West Germany, fish oil	2,179
France:	
salmon, fresh or frozen	1,290
seal furs	144
Switzerland, seal furs	988
Belgium, canned salmon	638
Norway, fish oil	1,026
Philippines, canned mackerel	553
Italy, seal furs	536

Trends by Areas: During 1964, Europe imported 59 percent of the total U.S. fishery products exports. The countries of the European Free Trade Association (EFTA) imported fishery products valued at \$24,956,000 or 39 percent of U.S. fishery products exports. Members of the European Economic Community (EEC or Common Market) imported fishery products valued at \$12,121,000 or 18 percent of the total fishery products exported. Products valued at \$13,008,000 or 20 percent of the total exports went to North America. Exports to Asian countries ranked third followed by South America and Africa.

Table 3 - United States Exports of Fishery Products by Area of Destination, 1964

Area	Edible	Inedible	Total
	(US\$1,000)		
Europe	21,639	16,414	38,053
North America	9,865	3,143	13,008
Asia	10,019	1,575	11,594
South America	343	112	455
Africa	314	36	350
Oceania	698	46	744
Total	42,878	21,326	64,204

Trends by Commodities: Significant increases in the exports of several major prod-

Table 4 - Value of United States Exports of Fishery Products by Selected Commodities, 1960-1964

Commodity	1964	1963	1962	1961	1960
	(US\$1,000)				
Fish oils	13,096	15,636	6,047	8,908	10,688
Seal furs	4,706	5,877	3,851	3,097	3,309
Shells, unmanufactured	1,606	2,136	1,285	1,380	2,636
Misc. fish (mostly fresh-water, fresh or frozen)	1,664	1,858	1,135	809	947
Oysters, shucked	301	191	311	448	497
Salmon:					
fresh or frozen	5,371	2,530	872	647	1,677
cured	743	509	528	593	435
canned	14,852	8,239	7,292	5,580	9,830
Mackerel, canned	1,140	681	671	581	211
Miscellaneous fish, canned	596	628	460	391	355
Sardines, canned not in oil	485	666	1,285	1,336	3,443
Shrimp:					
fresh or frozen	7,103	7,748	3,299	3,694	2,303
canned	3,664	3,054	2,572	2,487	3,383
Squid, canned	662	742	729	353	691

ucts were important factors in record-high exports of U. S. fishery products in 1964. Canned salmon exports increased 80 percent over the previous year and replaced fish oil as the most important among fishery products exported. Exports of fresh and frozen salmon more than doubled; canned mackerel exports increased 67 percent and shucked oysters 58 percent. The value of fish oil exports decreased 16 percent. Notable decreases also occurred in the exports of seal furs and unmanufactured shells.



Virginia

CATCH FORECASTS FOR MAJOR FISHERIES IN 1966:

Catch forecasts for major Virginia fisheries in 1966 were issued in October 1965 by the Virginia Institute of Marine Science. The predictions were based on sampling work done in the summer of 1965. Following are the Institute's forecasts:

Shellfish: SEED AND MARKET OYSTERS: Setting in the James River remains far below necessary levels for a suitable seed area. Seed supply will probably meet light demand. Supply of market oysters remains low due to continuing presence of MSX; no significant change is foreseen.



Fig. 1 - Virginia fishing areas.

BLUE CRAB: Marked increase in abundance; above average catches expected in 1966.

CLAMS: Insufficient data are available to predict how abundant hard or soft clams will be in the future. The supply of each is adequate to support the fishery, and both are probably under-exploited in Virginia waters.

SCALLOPS: Between April and September 1965, well over 1.5 million pounds (shucked weight) of sea scallops worth more than \$900,000 were dredged off the Virginia coast. This new fishery may become important to Virginia fishermen, but the extent of the scallop beds as well as the potential yield has not yet been determined.



Fig. 2 - Draggars unloading at Hampton, Va.

Fish: SPOT: Some decline in abundance expected because of weak year-classes of 1964 and spring 1965.

CROAKER: Reasonably good year-classes in 1964 and again in 1965 should insure improvement in this fishery in 1966. The 1965 catch exceeded the 1964 catch substantially, although the landings were still far below the 20-year average.

SEA TROUT: Continued light supply expected in 1966 because of a series of poor year-classes. Some improvement is expected in numbers of small market-size trout in 1966 summer season. Population has been fairly stable at very low level for the past 4 years.

MENHADEN: The year-class produced during the winter of 1964/65 was relatively weak. That was the third weak year-class in succession. The 1966 summer season should be no more satisfactory than the 1965 season. No real improvement can be expected through 1967.

SUMMER FL/OUNDER: Unusually large numbers of juvenile flounder appeared in Chesapeake Bay during 1964-65 and should enter the commercial and recreational fishery in 1966. Summer flounder catches should increase in 1966, unless those observations reflected only a localized situation.

OTHER FISH (alewife, herring, striped bass, shad, and sea bass): No significant change in stocks is expected, although only a limited amount of information is available for those species.



Washington

RECORD SALMON RELEASES FROM HATCHERIES IN JANUARY-JUNE 1965:

In the first 6 months of 1965, the 24 salmon hatcheries of the Washington Department of Fisheries planted 93.4 million young salmon of all species in Washington State waters. Most of those--75.2 million--were reared to migratory size before release. The remaining 18.2 million were fry that were planted in experiments and, in some instances, because of lack of rearing space or of food.

Fall chinook topped the list of releases with 54.0 million fingerlings (reared to migratory size in 3 months) and 14.8 million fry. Releases of silver yearlings (reared for a year) totaled 17.2 million, plus 1.8 million fry and 1.4 million fingerlings; spring chinook yearlings totaled 1.3 million; chum, 250,000 fry and 2.6 million fingerlings; and sockeye, 38,250 fry.

Total poundage of salmon planted by the Washington State hatcheries in January-June 1965 was a new record of slightly over a million pounds.

The supervisor of the Washington State Fisheries Hatchery Division said hatchery production had tripled in the past 10 years and that production could be tripled again in the next 10 years. Major items necessary to achieve this goal are some increases in water supplies, and an increase in rearing ponds and fish food, he said. The increased production can be accomplished with little, if any, increase in manpower.

The hatchery official said that since the State's hatcheries began rearing most salmon to a larger migratory size (the same age, but larger size than the natural stocks migrating to salt water) production had increased substantially. In an experiment, fish liberated at 35 to the pound had a return to the hatchery of 0.47 percent; an increase to 25 per pound resulted in a return of 1.31 percent; and releases of salmon 17 to the pound

resulted in a return of 2.81 percent. Ordinarily, a return to the hatchery of 1 percent is considered good. For each salmon returning to the hatchery, 3 or 4 are caught in the commercial and sport fisheries.

It was emphasized that the entire Washington State hatchery operation was assessed on a strict cost-production basis. Washington State estimates that each dollar spent returns at least three dollars worth of salmon to the State's commercial and sport fisheries. (Washington State Department of Fisheries, November 19, 1965.)

TEST FISHING FOR HAKE IN PUGET SOUND:

Test fishing for hake was carried out in Puget Sound waters in November 1965 by the trawler *St. Michael* under a program of the Washington State Department of Fisheries. (Hake are generally fished in offshore waters.) Under a permit issued by the Department of Fisheries, the test fishing was planned to find out if stocks of hake inside Puget Sound were abundant enough to support a fishery. Large quantities of hake have been caught in offshore experimental fishing, revealing the presence of considerable concentrations.

Under the permit issued, the vessel was to comply with all food fish licensing requirements of the State of Washington, and while it was to fish primarily for hake, any other food fish caught would be retained, sorted, and sold as such. Any salmon caught by the vessel was to be returned to the water immediately. Department personnel were permitted aboard the vessel to observe the method of fishing.

The vessel's skipper said that by using the latest electronic gear and a midwater trawl net, he could fish precisely for hake. The net used was a two-thirds scale on modified "Cobb" pelagic trawl net. (Washington State Department of Fisheries, Olympia, November 19, 1965.)

Editor's Note: The *St. Michael* had previously been chartered by the U. S. Bureau of Commercial Fisheries for 100 days (August-November 1965) of pelagic fishing gear research in Puget Sound and off the coasts of Washington, Oregon, and California. Two modified "Cobb" pelagic trawls were then tested.

Note: See *Commercial Fisheries Review*, October 1965 p. 44, and pp. 42-44 of this issue.



Wholesale Prices

EDIBLE FISH AND SHELLFISH, NOVEMBER 1965:

From October to November 1965 prices were higher for a number of selected items (frozen dressed salmon, shrimp, oysters, canned sardines); lower for several other items; and some were unchanged. At 119.4 percent of the 1957-59 average, the overall wholesale price index for edible fishery products in November rose 1.2 percent from the previous month. As compared with the same month a year earlier, the index this November was up 9.6 percent; prices ranged from higher to substantially higher for nearly all items in the index.

Lower prices at Boston for ex-vessel large haddock (down 20.8 percent) from October to November were responsible for a 2.6-percent drop in the November 1965 subgroup index for drawn, dressed, or whole finfish. But November prices at New York City were higher than in the previous month for frozen king salmon (up 4.5 percent) and round

fresh yellow pike (up 27.0 percent), and at Chicago for Lake Superior fresh whitefish (up 9.6 percent). As compared with the same month a year earlier, the subgroup index this November was up 15.0 percent because of much higher prices for all items--some up to one-third higher than in November 1964.

Higher wholesale prices at New York City from October to November for South Atlantic fresh shrimp (up 4 cents a pound) and at Norfolk for standard shucked oysters (up 4.5 percent) were responsible for a 4.3-percent advance in the November 1965 subgroup index for fresh processed fish and shellfish. Prices for fresh haddock fillets were down 3.0 percent from the previous month. The subgroup index this November was up 11.8 percent as against the same month in 1964--prices were higher for all items with shucked oysters up 20.8 percent.

In the subgroup for frozen processed fish and shellfish, prices this November were up for all items except haddock fillets and the index rose 3.1 percent. From October to No-

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, November 1965 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			Nov. 1965	Oct. 1965	Nov. 1965	Oct. 1965	Sept. 1965	Nov. 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.4	118.0	116.2	108.9
<u>Fresh & Frozen Fishery Products:</u>					122.7	121.1	117.9	113.0
<u>Drawn, Dressed, or Whole Finfish:</u>					128.5	131.9	135.8	111.7
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.18	.23	143.4	181.0	142.1	107.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	140.5	142.0	150.8	112.4
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.38	.84	122.3	117.0	131.0	115.6
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.58	.53	85.8	78.3	85.8	74.6
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.78	.61	126.9	99.9	155.5	106.4
<u>Processed, Fresh (Fish & Shellfish):</u>					124.2	119.1	107.3	111.1
Fillets, haddock, sml., skins on, 20-lb. tins.	Boston	lb.	.48	.49	115.4	119.0	116.8	108.9
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.91	.87	106.6	101.4	93.7	102.5
Oysters, shucked, standards.	Norfolk	gal.	8.75	8.38	147.6	141.2	122.3	122.2
<u>Processed, Frozen (Fish & Shellfish):</u>					110.9	107.6	105.3	110.8
Fillets, Flounder, skinless, 1-lb. pkg.	Boston	lb.	.41	.40	103.9	100.1	100.1	88.7
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	117.3	117.3	111.4	112.9
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.31	112.2	107.0	108.7	103.4
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.91	.87	107.3	102.6	101.4	112.7
<u>Canned Fishery Products:</u>					114.0	113.0	113.7	102.2
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	27.00	27.00	117.7	117.7	117.7	92.6
Tuna, lt. meat, chunk, No. 1 1/2 tuna (6-1 1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.6	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	9.50	131.5	121.9	128.3	128.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.



Fresh East Coast shrimp on display at one of the stands at Fulton Fish Market, New York City.

November, prices at Chicago for frozen shrimp were up 4.6 percent and at Boston for flounder and ocean perch fillets up 3.8 and 4.9 percent, respectively. Prices for haddock fillets were the same as in the previous month. As

compared with November 1964, the subgroup index this November was up only slightly (0.1 percent). While prices this November were generally higher than a year earlier, frozen shrimp prices were down 4.8 percent.

The November 1965 subgroup index for canned fishery products rose 0.9 percent from the previous month because of higher prices for canned Maine sardines (up 7.9 percent). Despite a substantial increase over the previous season in the 1965 pack of canned sardines, the market strengthened. The total available supply of canned sardines on November 1, 1965, was 5 percent more than a year earlier and prices this November were 2.5 percent higher. November 1965 prices for other canned fish in the index were unchanged from the previous month. As compared with November 1964, the subgroup index this November was up 11.5 percent--prices for canned pink salmon were 2.7 percent higher because of the very low 1965 pack, and for California jack mackerel up 14.2 percent. Prices for canned tuna were unchanged.



MENHADEN

The menhaden is not only the most important of the Middle Atlantic fisheries, but also the most important United States fishery in respect to the quantity landed by the commercial fishermen. For many years it has ranked second in dollar value in the region. Most of the catch is made with purse seines in coastal waters and landed at New Jersey, Delaware, and Virginia ports.



The menhaden is valuable for the industrial products (oil and meal) made from it. Practically none of the catch is used directly for human food. About one-third of all the fish meal prepared in the United States and one-fourth of the oils processed from sea animals come from menhaden taken in the Middle Atlantic region. Most of the meal is used as a supplement in feed of hogs and chickens; the oil is used in a variety of commercial products--margarine, paints, insect sprays, printer's ink, soaps, and lubricating oils--and in leather tanning and aluminum casting.

The region's 220-million-pound menhaden catch of the 1930's has increased to nearly a billion pounds in recent years with an annual ex-vessel value of about \$10 million--the result of an abundant supply of fish, larger and speedier boats, radio-equipped aircraft to spot and report the location of menhaden schools, larger purse seines and power blocks to haul them, and introduction of suction pumps to bring the fish quickly into the vessel hold and later unload them at the dock.

--Conservation Note 17, *The Big Bite*
(Commercial Fisheries of the Middle Atlantic Coast),
U. S. Fish and Wildlife Service, Washington, D. C.



FOREIGN

International

FOOD AND AGRICULTURE ORGANIZATION

WORLD FISH CATCH TOPS 50 MILLION TONS IN 1964:

The world fish catch soared to a record 51.6 million metric tons in 1964, according to the Food and Agriculture Organization (FAO). The 1964 catch was more than 4 million metric tons above the record 47.4 million tons caught in 1963.

Peru again led with the biggest single national catch of 9,130,700 tons in 1964 as against 6.9 million tons in 1963. Peru has led the world in national fish catch since 1962, when it overtook Japan. The bulk of the Peruvian annual catch is anchoveta, which is manufactured into fish meal for use as animal feed.



Fig. 1 - In Peru, older type anchoveta fishing vessel waiting to unload at the port of Chimbote.

Japan was in second place in 1964 with a catch of 6,334,700 tons, a drop of 360,000 tons from its 1963 catch of 6,694,700 tons. The Japanese catch is more varied than that of Peru since Japanese high-seas vessels fish all over the world.

The estimated catch of about 5.8 million tons for Communist China in 1964 placed her in third place.

The U.S.S.R. was in fourth place in 1964 with a catch of 4.48 million tons, an increase

of about 0.5 million tons over her 1963 catch of 3.98 million tons.



Fig. 2 - Japanese factoryship Tenyo Maru in North Pacific.

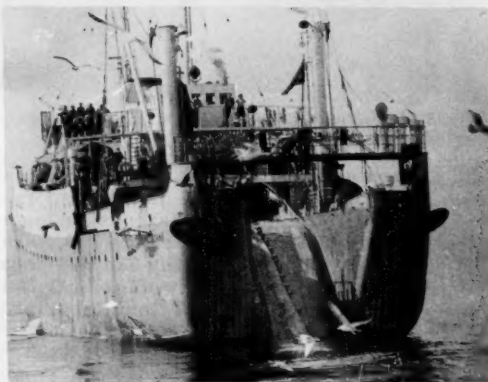


Fig. 3 - Soviet "Majakovski" stern trawler in North Atlantic.

The United States was in fifth place with 2,638,000 tons in 1964, a slight drop from the 2,776,700 tons landed in 1963.

The other countries which caught over a million tons of fish in 1964 were Norway with

International (Contd.):



Fig. 4 - United States tuna purse seiner operating from a California fishing port.

1,608,100 tons, India 1,320,300 tons, South Africa and South-West Africa (combined) 1,254,500 tons, Canada 1,210,700 tons, Spain 1,196,600 tons, Chile 1,160,900 tons, and Denmark (including Faroe Islands) 1,010,200 tons.

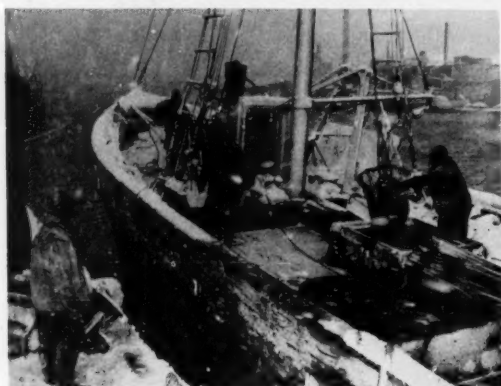


Fig. 5 - Unloading ocean perch from a U. S. trawler at the port of Gloucester, Mass., during a stormy winter day.

Countries with 1964 catches in excess of 0.5 million tons were the United Kingdom with 974,600 tons, Iceland 972,700 tons, Indonesia (estimated) 936,200 tons, France 780,400 tons, Federal Republic of Germany 624,300 tons, Philippines 623,500 tons, Portugal 603,700 tons, Thailand 577,000 tons, and Republic of Korea 524,000 tons.

Asian Fishermen Land 19 Million Tons in 1964: The nations of Asia and the Far East caught 19 million tons of fish in 1964 to lead all other continental areas. That catch was slightly above the 1963 total Asian catch of 18.98 million tons. But Asia's percentage of the world catch in 1964 fell to 37 percent as against 40 percent in 1963.

Japan again led Asia in national catch. Following Japan, the next Asian fishing nation was Communist China. India came next, and on a world basis ranked number seven. Next in order was the Philippines (up 57,900 tons from 1963), followed by Thailand and the Republic of South Korea. The last two for the first time joined the small circle of nations which catch above 0.5 million tons a year. Thailand's 1964 catch was up 158,300 tons over 1963 landings. South Korea's catch was 58,300 tons above 1963 and ranked 7th in Asia and 21st in the world.

Other Asian nations catching 50,000 tons or more were: South Viet Nam 397,000 tons, Taiwan 376,700 tons, Burma 360,000 tons, Malaysia 241,000 tons, Cambodia 164,600 tons, Ceylon 96,100 tons, and Hong Kong 76,300 tons.



Fig. 6 - Fresh-water fish farm near Mexico City, Mexico.

South America Lands One-Fifth of 1964 World Fish Catch: The South American fish catch reached an all-time high of 11,130,000 metric tons in 1964. That was more than one-fifth of the world total, and well above South America's previous high of 8.42 million tons caught in 1963.

Peru accounted for 82 percent of the South American catch. Her catch has now gone up about 110 times since the end of the Second World War.

Chile was the second most important South American fishing nation, with 399,000 tons more than in 1963. Argentina followed with 160,000 tons (an increase of 36,100 tons). Venezuela caught 110,600 tons as compared with 97,300 tons in 1963. Colombia increased her 1964 catch to 53,300 tons, a gain of 12 percent over the previous year. Ecuador caught

International (Contd.):

46,300 tons in 1964, a slight drop from its record 49,700 tons in 1963. Catches of other South American countries were small.

Europe's 1964 Fish Catch a Record: The nations of Europe, excluding the Soviet Union, caught 9.66 million metric tons of fish in 1964. The 1964 European catch was almost 800,000 tons above Europe's previous high of 8.89 million tons, caught in 1963. In 1964, Europe accounted for 19 percent of the world catch, the same percentage as in 1963. Only Asia with 19 million tons and South America with 11 million tons caught more fish than Europe on a Continental basis. Eight European countries were among the world's top 20 fishing nations.

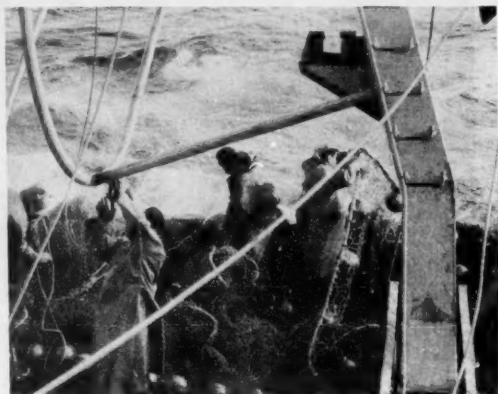


Fig. 7 - Aboard a French stern trawler.

Norway was the leading European fishing country with a 1964 catch up more than 200,000 tons from 1963, but below Norway's record 1956 catch of 2,187,300 tons.

Second among the European nations was Spain, with a record catch and an increase of about 9 percent over 1963.

The Danish catch in 1964 showed a small gain over the 985,000 tons taken in 1963.

The United Kingdom's catch was up 23,400 tons from 1963, but well below her record catch of 1,206,100 tons in 1948.

Iceland brought in a record catch in 1964, well above her 784,500 tons of 1963, and topping by better than 140,100 tons her previous high of 832,600 tons in 1962. France also had a record 1964 catch. West Germany's 1964 catch was slightly down from 1963. Portugal

was the only other European nation to catch more than 0.5 million tons--her 1964 catch was also a record, surpassing by 63,900 tons the previous high of 1963.

Other European nations catching 100,000 tons or more in 1964 were: the Netherlands 387,800 tons, Sweden 372,100 tons, Poland 264,300 tons, Italy 252,400 tons, and East Germany 224,900 tons.

Soviet Union Lands Nine Percent of World's 1964 Fishery Catch: The Soviet Union caught a record catch in 1964, up almost 13 percent from 1963. The 1964 Soviet catch accounted for 9 percent of the world total. The Soviet catch has almost doubled during the past 10 years and is about triple what it was in 1948. It now is greater than the United States and Canadian catches combined.

Among the 15 Soviet Republics that make up the U.S.S.R., the Russian Soviet Federated Republic, which stretches from the Arctic Ocean to the Caspian and Black Seas and from Europe to the Pacific, traditionally brings in about three-quarters of the total Soviet catch. The Russian S.S.R.'s 1964 catch was 3,333,500 tons, compared with 3,014 tons in 1963.

The second most important Soviet fishing area is the Baltic, where the Estonian, Latvian, and Lithuanian Soviet Republics normally bring in yearly more than 100,000 tons each. The 1964 catches for those Soviet Republics were 163,500 tons, 269,900 tons, and 208,400 tons, respectively, compared with 138,600 tons, 210,600 tons, and 177,200 tons in 1963.

Another important Soviet fishing area is the Ukrainian S.S.R., whose ports are exclusively on the Black Sea. In 1964, that Republic had a catch of 256,600 tons, compared with 210,700 tons in 1963.

Catches of other Soviet Republics in 1964 were as follows: Armenian S.S.R. 1,000 tons, Azerbaijan S.S.R. 52,800 tons, Byelorussian S.S.R. 6,100 tons, Gruzian S.S.R. 21,000 tons, Kazakh S.S.R. 106,000 tons, Kirgiz S.S.R. 1,300 tons, Moldavian S.S.R. 1,300 tons, Tadzhik S.S.R. 300 tons, Turkman S.S.R. 31,500 tons, and Uzbek S.S.R. 22,500 tons.

African Fishermen Land Record Catch: The nations and territories of Africa caught a record 2.91 million metric tons of fish during 1964, up 250,000 tons from 1963. The 1964 African catch accounted for 6 percent of the world total.

International (Contd.):

The South Africa Republic (includes South-West Africa) was the leading African fishing country with a 1964 catch up 83,700 tons from 1963. Angola had the next largest African catch with 355,800 tons in 1964, compared with 239,800 tons in 1963.



Fig. 8 - Conveyor and labeling machine in a South-West Africa pilchard cannery.

In 1964, Morocco's catch was 203,800 tons, against 184,700 tons in 1963. Senegal's was 127,400 tons, an increase over the 1963 catch of 118,200 tons.



Fig. 9 - Fishing canoes on a beach in West Africa.

Other African countries catching more than 20,000 tons in 1964 were: Chad 80,000 tons (the same as in 1963); Ghana 79,100 tons (compared with 62,800 tons in 1963); Uganda 72,100 tons (69,600 tons in 1963); Nigeria 59,000 tons (the same as in 1963); Zambia 30,800 tons (28,600 tons in 1963); Dahomey 26,000 tons; Sierra Leone 21,500 tons; and Kenya 20,700 tons. Catch data in 1964 for the United Arab Republic, Tanzania, and the Republic of Cameroon are not available. (FAO Yearbook of Fishery Statistics, Catches and Landings, 1964.)

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EASTERN HEMISPHERE COUNTRIES SEND DELEGATES TO FAO-U.S.S.R. STUDY TOUR ON FISHERIES TRAINING:

For the benefit of governments and territories in the Eastern Hemisphere with devel-

oping fisheries, a seminar and study tour on Soviet fisheries training was organized in the summer of 1965 by the Food and Agriculture Organization (FAO) in cooperation with the Soviet State Committee for Fisheries.

The Soviet Government considers its fishing industry one of the most important branches of its national economy. Soviet fisheries not only provide protein foods and full employment in fishing areas, but also promote growth in Soviet heavy industry. An elaborate system of fisheries training has enabled the U.S.S.R. to rapidly develop a modern and effective high-seas fishing industry.



Fig. 1 - Opening meeting of FAO-U.S.S.R. Seminar and Study Tour on Fishermen's Training.

The seminar and study tour began on August 26, 1965, in Moscow where 23 participants from 14 countries and 5 FAO staff consultants spent 5 days hearing lectures which described the general system of education in the U.S.S.R., and introduced aspects of fishermen's training. The group then spent the following 10 days in the fishing ports of Murmansk and Kaliningrad visiting fishery schools, research institutes, fishing vessels, and fishing installations before returning to Moscow for discussions by the participants. The tour set the stage for the participants to draw up training programs to suit the various kinds of fishing vessels and levels of technical development in their home countries.

The tour included visits to processing plants for filleting, smoking, pickling, cooking, canning, and freezing various fishery products. The participants also saw a Soviet fishing gear plant that made various types of fishing nets for the fishing fleet.

International (Contd.):



Fig. 2 - Soviet Polar Research Institute of Marine Fisheries and Oceanography, Murmansk.

Soviet fisheries management was illustrated by visits to the administrative board for the northern fisheries basin of the U.S.S.R. at Murmansk (Sevriba) and the administrative board for Kaliningrad. Visits were made to some of the Soviet organizations responsible for research in various geographical areas: PINRO (Arctic, Norwegian Sea, White Sea, and Barents Sea); ATLANTNIRO (Baltic Sea, Atlantic Ocean, and North Sea); and VNIRO, which coordinates the research of other fishery institutes. Special meetings were held with gear research personnel at PINRO and ATLANTNIRO to discuss bottom and midwater trawls, acoustic equipment, and fish identification techniques.

Countries sending delegates to the seminar and study tour were: Ceylon, India, Iran, Israel, Japan, Malaysia, Nigeria, Senegal, Sierra Leone, Somalia, Sudan, Tanzania, Yugoslavia, and Zambia. A U. S. fishery expert attended as a consultant for FAO.

FISH MEAL

WORLD PRODUCTION, AUGUST 1965:

World fish meal production in August 1965 was down 18 percent from the previous month due mainly to the closed anchoveta season in Peru and seasonally declining output in South Africa.

World fish meal production in January-August 1965 was slightly less than in the first 8 months of 1964. Peru accounted for about 45 percent of total output in January-August 1965. Most of the principal countries producing fish meal submit data to the International

World Fish Meal Production by Countries, August 1965 with Comparisons

Country	August		Jan.-Aug.	
	1965	1964	1965	1964
 (Metric Tons)			
Canada	9,193	5,999	53,252	36,711
Denmark	14,475	16,398	79,921	69,951
France	1,100	1,100	8,800	8,800
German Fed. Repub.	6,706	7,757	44,867	50,655
Netherlands	488	700	3,863	4,700
Spain	1/	1/	2/13,247	1/
Sweden	408	581	4,890	4,411
United Kingdom	6,406	5,770	54,567	53,038
United States	36,730	30,414	3/160,612	159,051
Angola	2,818	4,199	26,561	35,697
Iceland	17,505	13,389	85,194	86,552
Norway	43,056	19,703	232,845	134,558
Peru	369	56,112	893,022	1,009,592
So. Afr. (including S.-W. Afr.)	17,271	24,480	250,093	214,492
Belgium	375	375	3,000	3,000
Chile	3,703	6,161	50,845	103,459
Morocco	1/	4,200	2/1,100	13,250
Total	160,603	197,338	1,966,679	1,987,917

1/ Data not available.

2/ Data available only for January-May 1965.

3/ Revised.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

tional Association of Fish Meal Manufacturers monthly (see table).

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PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-AUGUST 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-August 1965

Country	August		Jan.-Aug.	
	1965	1964	1965	1964
 (1,000 Metric Tons)			
Chile	4.7	10.2	56.0	98.2
Angola	2.9	4.9	30.1	37.1
Iceland	16.2	11.4	80.5	77.8
Norway	30.3	9.4	147.5	130.4
Peru	46.5	104.4	1,076.0	1,016.4
So. Africa (including S.-W. Africa) ...	22.1	23.1	154.8	150.2
Total	122.7	163.4	1,544.9	1,510.1

Peru accounted for about 70 percent of the 1.5 million metric tons of fish meal exported by FEO countries in January-August 1965.

International (Contd.):

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-August 1965

Country	August		Jan.-Aug.	
	1965	1964	1965	1964
	... (1,000 Metric Tons). ...			
Chile	3.7	6.2	50.8	103.5
Angola	2.8	4.2	26.6	35.7
Iceland	17.5	13.4	85.2	86.5
Norway	43.1	19.7	232.8	134.6
Peru	0.4	56.1	893.0	1,009.6
So. Africa (including S.-W. Africa) ..	18.2	23.7	249.9	213.1
Total	85.7	123.3	1,536.3	1,583.0

INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION

12TH ANNUAL MEETING:

The 12th Annual Meeting of the International North Pacific Fisheries Commission (made up of representatives from Canada, Japan, United States) held at Seattle, Wash., was concluded November 12, 1965. The Commissioners representing each country spent a week in daily plenary and committee sessions studying the conservation problems of the international fisheries of the North Pacific. Two weeks of scientific committee meetings preceded the plenary sessions and furnished the reports and data on which the Commission based its deliberations.

The Commission reviewed the results of conservation programs and scientific research on North Pacific fishery resources and discussed their implications for the fishing industries of the three countries. Each national delegation included a large number of scientific and industrial advisors and government fishery administrators who assisted the Commissioners in their task of ensuring that the valuable fishery resources of the North Pacific continue to be developed with due regard to the requirements of conservation.

As in the past two years, the Commission did not recommend at this meeting any change in the stocks of fish which are subject to the "abstention" provisions of the North Pacific fisheries convention.

A major task of the Commission at this meeting was to recommend to the Contracting Parties conservation measures for the

halibut fishery in the Bering Sea, in which fishermen of all three countries participate. The stringent controls recommended for that fishery in 1964 were continued with only a two-day extension of fishing time over the seven-day open season of 1965. The legal size for halibut and other conservation measures were also included in the Commission's recommendations for the Bering Sea fishery. The area of the northeastern Bering Sea will remain open until November 15, 1966, for exploratory and experimental long-line fishing for halibut.

The Commission also studied the effects of the trawl fisheries for other species on the halibut stocks in the Gulf of Alaska. The Commission recommended more intensive research on that problem and noted that efforts are being made to minimize the incidental catch of halibut in that area.

In response to requests from the Governments of Japan and the United States, the Commission will continue its studies on Bering Sea king crab and will report the results to those two governments for their guidance in drawing up conservation measures for the crab fishery. The Canadian members of the Commission also expressed an interest in that fishery and requested that their government be kept informed of the results of research on the king crab stocks.

The matter of the high-seas salmon fishery in the area of intermingling of Asian and North American stocks west of 175° W. longitude was discussed. No agreement was reached concerning that problem.

The Commission reviewed at the 12th Annual Meeting the progress of publication of its scientific reports and noted that a number of major studies on salmon had been added to its list of bi-lingual bulletins during 1965. A nine-part comprehensive report on salmon of the North Pacific, written jointly by scientists of the three countries, will be one of the Commission's major contributions. This report is nearly completed and is scheduled for publication some time in 1966.

The 13th Annual Meeting of the International North Pacific Fisheries Commission will be held in Vancouver, B.C. The new chairman will be A.W.H. Needler of Canada, with Iwao Fujita of Japan as vice-chairman, and Edward W. Allen of the United States as secretary.

Note: See *Commercial Fisheries Review*, January 1965 p. 56.

International (Contd.):

INTERNATIONAL COUNCIL FOR
THE EXPLORATION OF THE SEA**53RD STATUTORY MEETING IN ROME:**

The 53rd Statutory Meeting of the International Council for the Exploration of the Sea (ICES) was held in Rome, October 3-13, 1965. About 160 delegates and experts attended from the 16 Member Countries (Denmark, Finland, France, Iceland, Ireland, Norway, Spain, Sweden, the United Kingdom, West Germany, the U.S.S.R., Belgium, Italy, Netherlands, Poland, and Portugal). Total attendance was about 220 persons including observers from many nonmember countries. About 20 committees and several additional working groups considered about 170 papers in separate meetings and presented their reports to the 7-man Bureau of ICES.

ICES acts as scientific adviser to the North-east Atlantic Fisheries Commission (NEAFC) through a special Liaison Committee. In the past, ICES has confined itself largely to the eastern part of the North Atlantic, primarily off Europe and Iceland. However, a new proposed ICES Convention, drawn up in 1964 and now awaiting complete ratification, would broaden the scope of ICES.

The 53rd Statutory Meeting of ICES began with a joint meeting with the International Commission for the Northwest Atlantic Fisheries (ICNAF) to discuss ways of achieving greater uniformity in sampling and measuring fish during fishery surveys. Such standardization is of interest to all those concerned with the management of North Atlantic fisheries.

The main work of the ICES Annual Meeting was carried out during the sessions of various permanent and ad hoc committees. A Comparative Fishing Committee recommended that more countries should experiment with cod-ends not needing top-side strengthening and large mesh chafers. That committee also asked for research reports on hydroacoustic methods from all Member Countries at the next ICES Meeting.

Of particular interest was the work of committees concerned with herring and salmon.

Herring: In view of the spectacular development of herring fisheries in the northern

part of the North Sea, it was recommended that:

Member countries should compile complete herring statistics and intensify sampling; an international tagging program should be launched; and a "Symposium on the Herring and Herring Fisheries in the Northern North Sea" should be held one day prior to the 1966 ICES Meeting. The Joint Norwegian-Soviet Investigation in the Barents Sea and adjacent waters should be continued and extended, and similar investigations should be conducted in Icelandic waters and on the Continental Slope from the British and Faroese Isles to the Norwegian Deep. The International Young Herring Service should be revived in the spring of 1967.

Salmon: The fishery for Atlantic salmon off West Greenland stirred wide general interest at the ICES Meeting. The Greenland inshore salmon catch increased from 15 metric tons in 1959 to 1,400 tons in 1964. A smaller Greenland salmon catch was forecast in 1965, due mainly to a diversion of fishing effort to other species. (See page 75 of this issue.)

Tag recoveries indicate that the Greenland salmon catch includes some fish spawned in rivers of Europe and North America. Salmon taken off Greenland have been quite fat, indicating they have been in or passed through an area of abundant food. Scientists at the ICES Rome meeting were in general agreement that more information is needed on the nature of Atlantic salmon stocks before any sound recommendations on management of the fishery can be made. It appeared especially important to tag salmon caught in Greenland to determine whether they return to home rivers in Europe and North America and, if so, in what numbers. The scientists also pointed out the need to further investigate the absence of Norwegian tagged salmon in the Greenland catches. During 1958-1965, Norway tagged 61,833 young salmon, 512 spawning salmon, and 7,435 "clean" salmon. The failure to recover any of those tagged salmon off Greenland may indicate the existence of some other important feeding area to which North Atlantic salmon migrate.

The discussion at the ICES meeting intensified interest in the proposed salmon research program previously drawn up by the Assessment Subcommittee of the International Commission for the Northwest Atlantic Fisheries

International (Contd.):

(ICNAF) at its June 1965 meeting in Halifax. The ICNAF Assessment Subcommittee had pointed out that present data are insufficient to determine what effect, if any, the Greenland salmon fishery is having on "home" fisheries. To determine the influence of the Greenland fishery, studies should be planned to find out the potential yield of the salmon stocks in Europe and North America, taking into account estimated natural losses at sea.

The ICNAF Assessment Subcommittee recommended the following studies in affected areas of North America, Europe, and Greenland: (1) collection of monthly salmon catch and fishing effort data, preferably by river of origin; (2) sampling of catches for length, weight, and age data; and (3) tagging of salmon as intensively as possible. It was also recommended that efforts should be made to identify the North American and European components of the Greenland catch by analyzing various biological characteristics.

Those ICNAF recommendations were endorsed by the ICES Salmon and Trout Committee, which also proposed a joint ICNAF/ICES Working Party on Atlantic Salmon. The proposed joint Working Party, composed of a representative from each concerned member country, would review, plan, and report on Atlantic salmon research. It was recommended that the proposed Working Party should meet in Spain in May 1966 prior to the ICNAF meeting for 1966.

Cooperation With International Organizations: It was recommended that: (1) ICES should participate in the SCOR/UNESCO Working Group on Carbon 14 Methods, and inform the Scientific Committee on Ocean Research (SCOR) of ICES work on intercalibration and standardization of chemical methods in oceanography; (2) a Working Group for a Joint Skagerrak Sea Expedition in 1966 should be established by ICES in cooperation with the Intergovernmental Oceanographic Commission (IOC) and SCOR; (3) ICES and ICNAF groups should explore the possibilities of preparing a "List of Fishing Craft Fishing in the North Atlantic"; (4) ICES should request the Food and Agriculture Organization (FAO) to keep ICES informed of progress on its "World Fishing Craft Register" for vessels over 500 GRT; (5) ICES should initiate through FAO a worldwide study of methods used and problems in-

involved in collection of fishery statistics from long-distance factory-trawler fleets, meanwhile Member countries should introduce effective systems; and (6) ICES should encourage UNESCO and SCOR to organize a "Symposium on the Hydrodynamics of Plankton Nets" to meet in Australia early in 1966.

Miscellaneous Symposia: In addition to those mentioned above, the ICES Meeting proposed future symposia on the following subjects: (1) "Ecology of Pelagic Fish Species in Arctic Waters" (principally capelin, silver smelt, smelt, and small gadoids)--scheduled immediately prior to the 1966 Meeting of ICES in Copenhagen; (2) "Study of Living Resources of the African Atlantic Continental Shelf, the Stocks of Such Resources, and Their Fisheries Between the Straits of Gibraltar and Cape Verde"--scheduled to be held in Spain in June 1967, subject to information available in 1966; (3) "Herring Recruitment"--scheduled to be held in 1968; and (4) "Food Chains in the Sea"--scheduled to be held in 1968.

ICES Meeting in 1966: The 54th Statutory Meeting of ICES will be held in Copenhagen, October 4-12, 1966.

New ICES Convention: On September 12, 1964, delegates from 15 Member Countries of ICES--Portugal was unrepresented--signed a Final Act of the Conference on ICES, providing for a new Convention for the International Council for the Exploration of the Sea. As of November 1, 1965, the new Convention had been ratified or approved by deposit of documents with Denmark by Denmark, Finland, Federal Republic of Germany, France, Iceland, Ireland, Norway, Spain, Sweden, the United Kingdom, and the U.S.S.R. At that time, Belgium, Italy, the Netherlands, Poland, and Portugal had not yet ratified the Convention. The Convention enters into effect on the July 22 next following ratification or approval by all signatory Governments. However, if that has not occurred by January 1, 1968, it may enter into force by mutual agreement if not less than three-fourths of the Governments have ratified or approved it. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, October 11 and November 17, 1965, and other sources.)

Note: See Commercial Fisheries Review, December 1964 p. 80.

INTERNATIONAL LABOR ORGANIZATION

MEETING ON CONDITIONS OF WORK IN THE FISHING INDUSTRY:

A preparatory Technical Conference on Fishermen's Questions was held October 18-

International (Contd.):

28, 1965, by the International Labor Organization (ILO) at its headquarters in Geneva, Switzerland. (ILO is a United Nations specialized agency devoted to improving the lot of the workingman.) Fifteen nations, including the United States, sent delegations; there were observers from three other nations and several international organizations such as FAO, IMCO, etc. The three subjects concerned with conditions of work in the fishing industry considered at the meeting were: (1) vocational training of fishermen; (2) crew accommodation on board fishing vessels; (3) certificates of competency.

Draft instruments on the three subjects were prepared and will be presented to the ILO Conference which meets in June 1966.

Vocational Training: Vocational training of fishing vessel personnel was the first subject discussed. After the election of officers and the organization of the Conference on October 18, a member of the ILO staff made opening comments on the subject. He summarized the principles which were involved and made suggestions as to how the Conference might proceed. Representatives of employer, worker, government, and observer delegations made statements regarding the aims, objectives, and methods of vocational training. Then, a working party prepared a draft instrument which makes recommendations on various aspects of vocational training and which was approved by the Conference. Such things as planning, administration, financing, training standards, types of programs, methods of training, and international cooperation are covered in the draft instrument.

Accommodation on Board Fishing Vessels:

This was the second subject taken up by the Conference. On October 20, initial discussions were begun in the plenary session. A member of the ILO staff described the history of ILO's work concerning crew accommodations on both merchant and fishing vessels. Representatives of the worker, employer, government, and observer delegations offered their views and made suggestions for improving the draft instrument which had been prepared by the 1962 Committee on Conditions of Work in the Fishing Industry convened by ILO. This Committee's draft was in the form of a proposed international convention, but it left open the specific minimum tonnage of

vessel below which its provisions would not be applicable.

A second working party of the Conference then began the review of the draft instrument on accommodations. In the opening discussions of the working party, the workers' spokesman requested that the draft instrument take the form of a convention and that it be applicable to all fishing vessels 25 gross tons and larger. However, he did indicate that they might accept a limit of 50 tons if this would facilitate an agreement. The employers countered that they were not convinced the instrument should be a convention and that they were for a 100-gross-ton minimum. Then the workers' vice-chairman turned to the government members and asked them to state their opinions. The government members from the United Kingdom and Denmark (who were naval architects) strongly asserted that the provisions in the proposed draft instrument on this subject could not be applied reasonably to a fishing vessel under 100 gross tons. Necessary cargo space, stability of the vessel, and other factors made a 25- to 50-gross-ton minimum impractical. The United Kingdom also indicated a preference for a minimum level of 80 feet in length which was roughly 100 gross tons in size.

The United States member indicated that its representatives at the 1962 Committee meeting had stated a preference for the 100-gross-ton minimum and that after review by technicians there was no reason to change that position. However, if the Conference decided on a different minimum tonnage to exempt small fishing vessels, the United States would work constructively with the majority provided that all subparts of the draft instrument called for crew accommodations which could be reasonably accomplished from a technical standpoint on a vessel of the size specified. It was also indicated that the United States preferred the recommendation form of instrument but would also work constructively with the group if a majority favored the convention form. The naval architects from the United Kingdom and Denmark were then asked to meet separately with a few of the workers' and employers' representatives to thoroughly review this problem.

On October 22, after the select group had reported back to the working party, it was decided to provide for a 75-gross-ton minimum with the provision that the instrument may be applied to vessels between 25 and 75 gross

International (Contd.):

tions where the competent authority determines after consultation with the fishing vessels owners' and fishermen's organizations, where such exist, that this is reasonable and practicable. Then the employers acceded to the workers' desire to prepare the instrument in the form of a convention and with no dissent from any of the members present it was agreed to unanimously. (Later in plenary it was also agreed the proposed instrument would not be applicable to vessels and boats which normally remain away from port for periods of less than 36 hours and in which the crew does not live on board.) Then the technical aspects of the wording of all the other principal subparts of the instrument were completed. The revised draft instrument was presented to the Conference and except for some minor revisions was approved. The draft instrument details specifications for sleeping rooms, including size of bunks, lockers, etc., galleys, messrooms, and sanitary accommodations, including wash basins, tub and/or showers, and water closets. The specifications would apply to all new or reconstructed fishing craft except the smaller exempt sizes.

Certificates of Competency: This was the third subject considered. After an initial presentation by the ILO staff which also referred to ILO Convention No. 53 concerning the Minimum Requirement of Professional Capacity for Masters and Officers on Board Merchant Ships, the subject was given to the first working party to iron out technical details of a proposed draft instrument. There was a prolonged debate in the working party as to the size of vessel on which the licensing requirements would be applicable. The workers group insisted on 25 gross tons and larger. The United States Government delegate and employer's delegate objected. Then reservations were made by those two delegates which appeared in the record and show that in the United States, officers are certified only on board fishing vessels of over 200 gross registered tons.

In many northern European countries certification is already required for officers on smaller fishing vessels. A majority of the nations indicated approval of the 25-gross-ton minimum, and the draft instrument was presented to and approved by the Conference with that exemption provision. The draft instrument covers skippers, mates, and engineers. It prescribes minimum age of person-

nel, requirements for examinations, and enforcement requirements.

Summary: Each of the draft instruments will now be considered by the 1966 ILO Conference. They will be voted on and if approved will be sent to member nations for ratification. When this occurs, the instruments will have to be approved by the U. S. Senate if they are subject to ratification, at which time the public will have an opportunity to present its views.

NORTH AMERICA

SHARE OF WORLD FISH CATCH DROPS IN 1964:

The North American countries caught less fish in 1964 than in the year before--4.28 against 4.37 million metric tons--and 8 rather than 9 percent of the world total, according to the Food and Agriculture Organization (FAO). For fishery statistical purposes, FAO classifies Central America, Greenland, and the Caribbean Islands as well as Canada, Mexico, and the United States as North American countries. North America's percentage of the world catch has dropped consistently since 1948, when it was 19 percent of the world total.



The United States catch in 1964 was 2,638,000 tons, a drop of 138,700 tons from

International (Contd.):

1963. In terms of catch, the United States still ranked fifth among the world's fishing countries.

Canada's catch was a record 1,210,700 tons, up 13,300 tons from 1963. Canada ranked ninth among fishing nations in 1964 compared with seventh in 1963.

Mexico also reported a record catch of 258,400 tons as compared with 244,300 tons in 1963.

Greenland's 1964 catch came to 38,300 tons, an increase over 1963's 33,300 tons, but less than the record 43,300 tons caught in 1962.

Cuba reported a new high of 36,300 tons compared with her 1963 catch of 35,600 tons. Panama's 25,600 tons was almost double the 13,400 tons of 1963. Jamaica also reached a new high of 16,000 tons compared with 13,900 tons in 1963. All other North American countries and territories caught less than 10,000 tons. (FAO Yearbook of Fishery Statistics, Catches and Landings, 1964.)

NORDIC COUNTRIES

NEW FISHING LIMITS RECOMMENDED:

In October 1965, Nordic fishing industry organizations of Denmark, Norway, and Sweden met in Stockholm and recommended an extension of international fishing limits to 12 nautical miles. However, the Nordic associations also proposed that their own fishing vessels should be subject to fishing limits of only 4 miles in Nordic waters of Denmark, Norway, and Sweden. The Governments of those countries were expected to give prompt consideration to the industry recommendations.

The extension of fishing limits to 12 nautical miles by Denmark and Sweden in the Kattegat Sea would practically exclude fishing by the Soviet, Polish, and East German fleets which have been actively fishing for herring in that area in recent years. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, October 21, 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 48, and Sept. 1964 p. 54.

SALMON

PACIFIC FISHERIES DISCUSSED AT UNITED STATES-CANADIAN MEETING:

United States and Canadian fishery experts from Government and industry met in Washington, D. C., October 12-14, 1965, to exchange preliminary views on problems of mutual concern related to United States and Canadian coastal fisheries on the west coasts of the two countries. Technical consultants from the International Pacific Salmon Fisheries Commission were also present.

Discussions centered on problems arising from the intermingling in the United States and Canadian salmon fisheries off southeastern Alaska and northern British Columbia of salmon bound for both Canadian and United States streams; and on the adequacy of the provisions of the 1956 Protocol to the 1930 Sockeye Salmon Convention, which brought pink salmon in the Convention area within the responsibilities of the International Pacific Salmon Fisheries Commission.

Delegates to the meeting in Washington in October 1965 made no specific proposals. However, tentative agreement was reached on a further meeting on those two questions in the spring of 1966 in Ottawa when specific proposals for joint action will be considered. Joint United States-Canadian committees of scientists have been appointed to examine and report on technical aspects of those problems. (U. S. Department of State, October 14, 1965.)

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSIONANNUAL MEETING ANNOUNCED:

The International Pacific Salmon Fisheries Commission announced that its Annual Meeting would be held in Bellingham, Wash., on December 17, 1965. On that date the Commission expected to meet with its Advisory Committee and the public to report on the 1965 Fraser River sockeye and pink salmon runs and to discuss prospects for the 1966 sockeye run.



Australia

SPINY LOBSTER PRODUCTION DROPS IN FY 1964/65:

Australia's spiny lobster catch in fiscal year 1964/65 (July 1-June 30) was estimated to be 26.6 million pounds (live weight), about 1.3 million pounds less than the previous year. Most of the drop was in the State of Western Australia, the main producing area. That State's catch was estimated at 17 million pounds, or about one million pounds below 1963/64.

About 14 million pounds of the Western Australian catch was from the coastal fishery as compared with 15.1 million pounds in the previous year. Production in that State's Abrolhos area increased from 2.9 million pounds in 1963/64 to 3.1 million pounds in 1964/65. The weather in March 1965, when the Abrolhos season opened, was much more favorable than in 1964 which permitted fishing on some reefs not previously accessible.

The spiny lobster catch in the State of South Australia was estimated at more than 4.8 million pounds, and could be a record, according to the South Australian Director of Fisheries and Fauna Conservation. Favorable weather and a larger fleet during 1964/65 accounted for the increase.



Two larger specimens of Australian spiny lobster.

The catch in Tasmania was estimated to have been about 3.2 million pounds, a drop of 400,000 pounds from the previous year. Ad-

verse weather during the main fishing season was believed partly responsible for the decline. The number of new spiny lobster fishing grounds located during the year also was less than in previous years.

The catch in Victoria for 1964/65 was estimated at about 1.2 million pounds, a drop of 5.8 percent from the previous year. Spiny lobster catches in other waters were up from the previous year. (*Australian Fisheries Newsletter*, October 1965.)

* * * * *

SHRIMP FISHERY TRENDS, FISCAL YEAR 1964/65:

Australia's total shrimp landings in fiscal year 1964/65 (July-June) amounted to 12.6 million pounds, down only slightly from the record 13.0 million pounds landed in 1963/64. The trend has been upward in the past 10 years, with shrimp landings almost doubled since 1954/55.

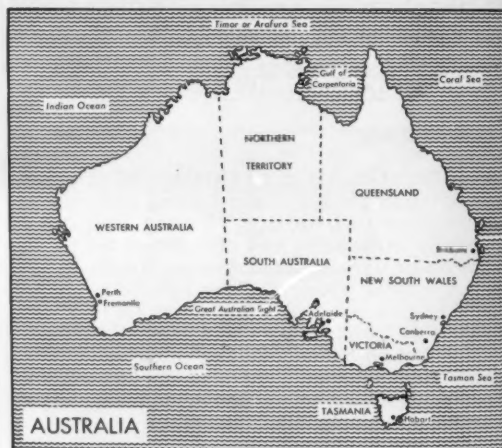


Fig. 1 - Map of Australia.

The principal shrimp-producing states are: Queensland with landings in 1964/65 of 5.7 million pounds; New South Wales, 4.4 million pounds; and Western Australia, 2.5 million pounds. Landings for other states (Victoria and Northern Territory) were not available but are not likely to make any significant difference in the total.

The 1964/65 shrimp landings in Queensland were up 12 percent from the previous year due largely to the development of the

Australia (Contd.):

fishery in deeper waters off the southern Queensland coast. Those grounds have produced giant king shrimp, most of which are exported.

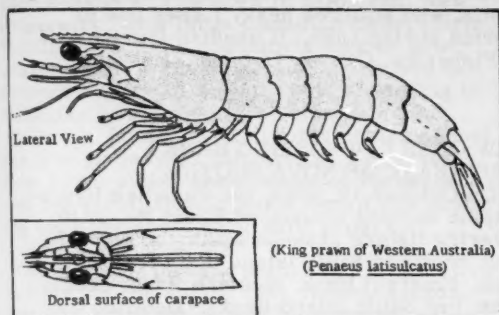


Fig. 2 - King prawn (*Penaeus latissulcatus*) of Western Australia.

Western Australia's shrimp landings were up 18 percent from 1963/64 because of development of the shrimp fishery in northern waters of that state which also produces large shrimp for export.



Fig. 3 - Australian shrimp trawler.

Shrimp landings of 4.4 million pounds in New South Wales dropped 28 percent from the 6.1 million pounds in 1963/64. Shrimp production of that state is about evenly divided between the estuarine and inshore fisheries that yield smaller shrimp which are mainly consumed locally and the deep-sea fishery which produces larger shrimp, the bulk of which is exported. In 1964/65, shrimp landings were down for all those fisheries.

Drought conditions in the estuaries were believed responsible for the drop in the New South Wales estuarine shrimp catch, and also affected the movement of shrimp stocks to the offshore shrimp grounds resulting in lower catches by trawlers. When drought conditions there ease, it is believed that shrimp landings in that state will resume the upward trend which started in 1961. Combined with efforts being made to develop a shrimp fishery in northern Australia, it is anticipated that shrimp production will increase in the future. (*Australian Fisheries Newsletter*, November 1965.)

Note: See *Commercial Fisheries Review*, November 1965 p. 46.

RESULTS OF SHRIMP SURVEY OFF NEW GUINEA:

A fisheries survey vessel operated by the Australian Federal Government Fisheries Division returned to Madang in October 1965 after completing a two-week shrimp survey in the Ramu River area of New Guinea. The vessel caught 1,800 pounds of shrimp from about 95 short trawls. The catch included banana (*Penaeus merguensis*) and tiger (*Penaeus esculentus*) shrimp, red-tailed and green shrimp, and a new unidentified bluish-green hardback type of shrimp.

The best fishing areas found during the survey were north and south of the river at distances up to three miles from shore. At times trawling was difficult because strong tides dragged the trawl nets and caused "mudding up," and an accumulation of mud at the river mouth put added strain on the trawl nets. (*Australian Fisheries Newsletter*, November 1965.)



Canada

BRITISH COLUMBIA HERRING FISHERY LABOR NEGOTIATIONS:

British Columbia herring fishermen were reported to be asking processors to pay C\$20.48 per short ton for herring landed during the 1965/66 season (as compared with C\$14.48 paid in 1964/65).^{1/} The fishermen also asked the processors to provide vacation pay, contribute to a pension plan, and increase contributions to medical and welfare plans.

The fishermen and processors had not reached an agreement by mid-October 1965. The fishermen then declared a 2-week holiday from fishing during October 17-31, 1965.

A work stoppage on herring vessels employed in operations of the British Columbia Fisheries Association was approved November 1, 1965, by the British Columbia United Fishermen and Allied Workers Union.

Meanwhile, in Prince Rupert, British Columbia, a share agreement was reached covering most of the herring vessels employed in operations of the Prince Rupert Fishermen's Cooperative Association. (Editor's Note: The Prince Rupert Coop is at least partly a Union operation. Therefore, the Prince Rupert agreement was, in effect, a negotiation between fishermen and vessel owners, rather than a negotiation between fishermen and processors.) The Prince Rupert agreement provides the vacation and welfare benefits asked by fishermen and gives the fishermen 56½ percent of the net proceeds from the sale of processed herring after operating and overhead costs of the Coop are deducted. The settlement at Prince Rupert cleared the way for herring vessels in that area to resume fishing in early November. The Prince Rupert herring fishermen were to contribute part of their earnings after December 1, 1965, to the Union's emergency fund, if the herring labor dispute elsewhere in British Columbia was not settled by that date. (The Fisherman, Vancouver, B.C., November 5, 1965.)

^{1/}Editor's Note: Ex-vessel prices for herring in British Columbia are not comparable to prices in certain other countries because British Columbia processors furnish much of the equipment used in the fishery.

Notes: (1) US\$1.00 equals Canadian \$1.08.

(2) See Commercial Fisheries Review, Feb. 1965 p. 53.

NOVA SCOTIA LOBSTER FISHERMEN RECEIVE GOVERNMENT AID FOR STORM DAMAGE:

The Canadian Federal Government and the Nova Scotia Provincial Government have each provided \$16,000 to assist lobster fishermen in Halifax and Guysborough Counties, Nova Scotia, who suffered heavy losses due to storms during 1965. (Canadian Department of Fisheries, Ottawa, October 21, 1965.)

NEW CHART OF FISHING BANKS SOUTHEAST OF NOVA SCOTIA:

On October 19, 1965, the Canadian Hydrographic Service announced Chart No. 4040, covering fishing grounds south and east of Nova Scotia to Sable Island (including Sambro Bank, Emerald Bank, Western Bank, Middle Bank, and Sable Island Bank). Detailed contour lines are a feature of the new chart.

Drawn on a scale of 1:300,000, or about 4 miles to the inch, the new chart illustrates depths primarily by blue contour lines. The contour lines on the chart are spaced at 10-fathom intervals to a depth of 100 fathoms, at 20-fathom intervals to 200 fathoms, and at every 100 fathoms to a depth of 1,000 fathoms. The small contour interval clearly outlines the edges of the fishing banks. It also reveals for the first time the exact position and shape of such features as "The Owl," "The Cow Pen," and "The Patch."

The new chart is the second of its type to be issued by the Canadian Hydrographic Service. The first, No. 4041, covers the Atlantic Coast banks of Banquereau and Misaine, which lie off Nova Scotia between Scatarie and Sable Islands. As an added feature, Chart No. 4040 shows the location of cables in the area and Armed Forces exercise areas.

The new chart is available in two versions: L(D7)4040 which shows the Decca lattice for Nova Scotia chain 7, and 4040-L which shows the three Loran-A rates covering the area. Each is priced at \$2.00 and may be obtained from Canadian chart dealers or from Hydrographic Chart Distribution, Canadian Department of Mines and Technical Surveys, Ottawa, Canada.

Note: See Commercial Fisheries Review, Nov. 1964 p. 79.

Canada (Contd.):

NEW FISH-PROCESSING PLANT TO BE BUILT IN SHIPPIGAN, NEW BRUNSWICK:

A \$1 million fish-processing plant capable of handling 20 million pounds of fresh fish each season will be built in Shippigan, New Brunswick, by a large Canadian fishery firm. It will replace the company's former processing plant on the same site which was destroyed by fire in August 1965, according to a Halifax newspaper. The announcement, was made jointly by the firm's chairman and the New Brunswick Minister of Fisheries. New Brunswick's Department of Fisheries and Industrial Development Board are assisting the company's rebuilding program.

It is hoped that the plant will be operative in time for the spring 1966 fishing season. The new plant which will be equipped with the most recently developed machinery available to the Canadian fish-processing industry, will employ 175 men and women to start--about the same number employed in the former plant. The number of plant workers is expected to increase as production rises. Plans call for a fish meal plant capable of processing 10 tons of raw fish an hour to be incorporated with the new filleting plant. (United States Embassy, Ottawa, November 15, 1965.)

NEWFOUNDLAND FISHERIES AIDED BY NEW BAIT-HOLDING UNITS:

Nine additional bait-holding units are being established to make bait more readily available to commercial fishermen in Newfoundland settlements. Forty-eight such establishments are already being operated in the Province by the Newfoundland Bait Service of the Canadian Federal Department of Fisheries. The new units will be located at Petty Harbour, Cow Head, Pass Island, Point Rosie, Fogo, Winterton, Cooks Harbour, and Forteau. In addition, a holding depot will be set up at West St. Modeste with freezing facilities and a holding capacity of 100,000 pounds of bait. It will be able to supply bait to the smaller units in adjacent areas when necessary, as well as to local fishermen. The depot, which is to cost about \$56,000 to build, is expected to be in operation early in 1966.

The bait-holding units extend the fishing season in areas where lack of bait has restricted fishing operations. The units are

supplied with frozen bait by refrigerated trucks and the M/V Arctica, the Bait Service's refrigerated vessel.

Since 1949, when the Newfoundland Bait Service was transferred to the Canadian Federal Government, the number of distribution outlets has been increased from 20 to 57, in order to extend the facilities to areas where sufficient bait was not previously available from private or public sources. (Canadian Department of Fisheries, Ottawa, October 21, 1965.)

NEWFOUNDLAND SEEKS JAPANESE HELP TO DEVELOP OFFSHORE FISHERY:

Newfoundland's Provincial Government was reported seeking Japanese participation in developing its offshore bottom fishery. Reportedly, a formal request for Japanese technological assistance was made by Newfoundland's fishery delegation at the completion of a three-week Japan tour sponsored by a large Japanese fishing company and fish net manufacturing firm. Newfoundland was said to be primarily seeking to develop its offshore cod and herring fisheries, and showed particularly keen interest in developing the abundantly available but unused resources, such as herring roe, for export to Japan. (Suisan Keizai Shimbun, November 3, 1965.)

CONFERENCE ON ATLANTIC OFFSHORE FISHING VESSELS:

A Canadian Atlantic Offshore Fishing Vessel Conference will be held February 7-9, 1966, in Montreal, P. Q., Canada. It is sponsored by the Federal-Provincial Atlantic Fisheries Committee made up of Deputy Ministers of Fisheries of the Canadian Federal government and the five Atlantic coast provinces. Naval architects and government officials from Canada, the United States, and Europe, and operators of large fishing vessels will attend.

The Canadian Atlantic deep-sea fishing fleet is undergoing rapid expansion, and there is a need for vessel designs suited to the specific requirements of the offshore fisheries. This, together with a need for improving living and working conditions for Canadian fishermen in the light of the progress being made by shore industries, has prompted the conference. It will be the first opportunity for rep-

Canada (Contd.):

representatives of all groups with an interest in offshore fishing to discuss the problems of deep-sea operations in the Northwest Atlantic.

Between 25 and 30 papers will be presented. Some of them will deal with mechanized fishing operations, navigation and propulsion systems, fish processing and handling equipment on board ship, and vessel design.

The fishing industry's viewpoint on the development of Canadian Atlantic offshore fishing vessels will be given by representatives of fishing companies. Naval architects, engineers, and builders will discuss combination side trawlers and purse seiners, wooden and steel side trawlers, fish carriers, vessel stability, the comfort of fishermen, and layout of accommodation on fishing vessels. Steel stern trawlers, particularly those of Canadian design, will be the subject of several papers. Factory trawlers, motors, deck machinery, and automation generally will also be discussed, and there will be papers on scallop draggers, sealing and whaling vessels, fish holds, the economics of fishing vessels, and the relationship between such economics and naval architecture.

The chairman of the conference will be Dr. A.W.H. Needler, Deputy Minister of Fisheries of Canada. He and the provincial government officials on the committee will speak on the development of Canadian offshore fishing operations in the Atlantic. (Canadian Department of Fisheries, Ottawa, November 10, 1965.)

* * * * *

FISHERIES TRADE MISSION VISITED ITALY, SPAIN, AND PORTUGAL:

A 5-man fisheries mission left Canada October 22, 1965, for a 20-day tour of Italy, Spain, and Portugal. Sponsored by the Canadian Department of Trade and Commerce, the mission assessed the long-term export possibilities for Canadian fishery products in those countries. The three countries are important customers for Canadian salt cod.

The mission also examined fishery developments in Italy, Spain, and Portugal and studied their respective methods of production and marketing.

The mission planned to prepare a report of its findings for distribution to the Canadian fisheries industry. (Canadian Department of Trade and Commerce, October 21, 1965.)



Chile

FISHERY TRENDS, THIRD QUARTER 1965:

As a result of continued poor anchoveta fishing throughout the third quarter of 1965, Chilean fish meal production in the first 9 months of 1965 totaled only 51,906 metric tons. That was 75,000 tons less than in the same period in 1964, and some 25,000 tons below 1963. More than 25 plants, 250 vessels, and several thousand workers have been largely idled by the continued anchoveta shortage. The financial position of a number of firms is critical. More failures would certainly result if loan payments were insisted on by the Production Development Corporation of Chile (CORFO) and foreign creditors.

As part of its program to tide the stricken industry over during the prolonged resource shortage, the Chilean Government has proposed new fisheries legislation that would (1) encourage integration among the firms and (2) allocate funds for the payment, in part, of export subsidies due under the 1960 Fisheries Law. However, those proposals were still waiting for final approval by the Chilean Legislature in late October 1965.

The prolonged period of depression in the anchoveta fishery has brought economic hardship to many. There are indications, however, that the bitter experience may help the future development of Chile's extensive marine resources. Fish meal firms threatened with closing have diversified into freezer and canning. Boatyards are successfully converting purse seiners into trawlers. New plants and supporting facilities are moving in along the central and southern Chilean coasts to catch and process shrimp and frozen hake fillets. The Government, as well as the industry, is in general adopting a more flexible attitude toward development of the fishing industry. In addition, the introduction of meatless days is having a pronounced effect on domestic consumption of fish (increases of 50 percent and more have been reported) which should assist in broadening the limited domestic market for fish and shellfish. All of those moves should brighten the long-range outlook for Chilean

Chile (Contd.):

fisheries. (United States Embassy, Santiago, October 29, 1965.)



Cuba

TRAWLERS AND TUNA VESSELS ORDERED FROM SPAIN:

The Cuban Government has ordered 20 tuna vessels and 6 bottomfish trawlers from Spanish shipyards. Specifications of the order call for trawlers of 800 to 1,000 gross registered tons and an overall length of 60 meters (197 feet). The 500-ton tuna vessels ordered are an improved version of the "Gipsa-type" vessel with refrigeration units.

Bilboa shipyards were reported to be building 18 of the tuna vessels; Vigo shipyards were to build 2 of the tuna vessels and all of the trawlers.

As of mid-October 1965, it was believed that none of those vessels had been delivered, although 5 of the tuna vessels and 1 of the trawlers had been launched. Construction had started on 7 or 8 of the remaining tuna vessels. (United States Embassy, Madrid, October 14, 1965.)



Republic of Dahomey

GOVERNMENT FORBIDS TRAWLING WITHIN 12-MILE FISHING LIMITS BY UNLICENSED FOREIGN VESSELS:

By law No. 65-10 of June 23, 1965, the Government of the Republic of Dahomey forbids trawling by unlicensed foreign vessels within Dahomean territorial waters, now set at 12 miles. It has been reported that foreign vessels based in Dahomey may obtain without cost the necessary license.

The law was apparently passed in anticipation of the development of a shrimp industry in the Gulf of Guinea off Dahomey. (United States Embassy, Cotonou, November 2, 1965.)



Denmark

FISHERY TRENDS, JANUARY-SEPTEMBER 1965:

Landings: Fishery landings in local ports by Danish vessels in the first nine months of 1965 were up 5 percent from the same period in 1964. Substantial increases in landings of cod, cod-like species, pond trout, shrimp, mussels, and industrial fish more than offset lower landings of flatfish, brisling, Norway lobster, and starfish. Landings by foreign vessels, mainly Swedish, were 11 percent higher. Total landings by foreign vessels could increase if the Danish Minister of Fisheries approves an industry request to permit Norwegian vessels to land industrial fish, primarily herring, in Danish ports. Landings by Danish vessels in foreign ports were below the same period in 1964 because of delays earlier in 1965 in landing their catches in English ports.

Ex-vessel prices for the main species landed continued mostly higher than in 1964. The combination of higher prices and increased landings point to a very profitable year for most Danish fishermen. Salmon prices and those for several other species were down from the higher prices in 1964.

Table 1 - Danish Fishery Landings, January-September 1965 with Comparisons

Species	January-September	
	1965	1964
.. (Metric Tons) ..		
Landings in Denmark		
by Danish vessels:		
Flatfish 1/.....	46,485	55,859
Cod	61,780	52,641
Cod-like fish 2/	55,962	38,137
Herring	258,601	256,185
Brisling	2,900	6,887
Mackerel	5,297	5,180
Eels	1,630	1,678
Salmon	936	777
Pond trout	8,248	6,405
Other fish 3/	208,187	196,250
Norway lobster	1,422	1,782
Shrimp	4,581	2,965
Mussels	12,299	11,058
Other shellfish	124	52
Starfish	1,819	2,449
Total	670,271	638,305
Landings in Denmark by foreign vessels	150,131	135,739
Total landings in Danish ports	820,402	774,044
Landings in foreign ports by Danish vessels	2,993	3,649

1/Plaice, flounder, dab, common sole, etc.

2/Haddock, coalfish, hake, ling, etc.

3/Mostly industrial fish such as sand eels, Norway pout, etc.

Denmark (Contd.):

Pond trout prices in 1965 were also lower due to a sharp production increase.

Processing: Production of most processed fishery items was higher in the first nine months of 1965. The increased demands for frozen fish fillets and fish blocks from the

higher prices. Production of plaice fillets was off slightly as the supply of that species did not respond to a strong demand and higher prices. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, November 17, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 72; February 1965 p. 54.



Table 2 - Danish Production of Processed Fishery Products, January-September 1965

Product	January-September	
	1965	1964
. . (Metric Tons) . .		
Canned:		
Herring & sprats	2,010	2,216
Mackerel	1,088	1,114
Other fish	3,298	3,600
Mussels	438	821
Other shellfish	1,206	351
Total	8,040	8,302
Semi-preserved:		
Herring & sprats	3,954	3,301
Other fish	347	305
Mussels	557	489
Total	4,858	4,095
Fresh & frozen fillets:		
Cod	21,475	17,871
Cod-like fish 1/	2,626	1,002
Plaice	13,852	14,108
Other flatfish	1,559	787
Herring	35,421	25,584
Other fish	104	163
Total	75,037	59,515
Smoked:		
Herring & sprats	1,700	1,554
Mackerel	1,466	1,486
Eels	502	520
Salmon & trout	558	345
Other fishery products	196	152
Total	4,422	4,057
Miscellaneous:		
Force meat 2/	1,437	1,259
Salted herring	121	92
Dry-salted cod	174	398
Other fishery products	1,323	5,731
Total	3,055	7,480
Industrial products:		
Meal	92,326	78,529
Oil	28,597	20,856
Ensilage 3/	4,172	6,106
Solubles	13,997	8,188
Total	139,092	113,679

1/Haddock, coalfish, hake, ling, etc.

2/ Ground fish, milk, and flour.

3/ Chemically treated raw fish.

Source: Ministry of Fisheries.

United States and herring fillets from West Germany resulted in more production of those products. Production of fish meal, solubles, and oil were up because more herring, sand eel, and other industrial fish were landed at

Faroe Islands

BRITISH QUOTA ON FAROESE LANDINGS LIBERALIZED:

In March 1964, an unofficial quota on Faroese deliveries of iced and frozen fish to the United Kingdom was imposed by British fishing organizations. (The action followed the extension of Faroese fishing limits to 12 nautical miles.) Under that quota, the combined annual value of Faroese landings of iced fish in British ports and Faroese exports of frozen fish to Britain was limited to £850,000 (US\$2.38 million), and only one-quarter of that amount could be landed in any 3-month period. Landings in British ports from Faroese vessels had been rising rapidly and had reached a value in 1963 of £1.25 million (\$3.5 million).

The quota restrictions have been unpopular with British fish merchants, especially in the ports where Faroese vessels normally unload. Therefore, a British fishing industry committee signed a new agreement with the Faroese, effective October 1, 1965, for a 5-year period which raises the quota to £1 million (\$2.8 million) a year. Other major revisions in the quota include: (1) relaxation of the seasonal limitations to permit the entry of the entire quota between October and March, when British domestic landings are lightest; (2) changes in the species of fish that can be imported; and (3) removal of all quota restrictions on herring and salt fish landed in Britain for re-export.

The new agreement does not provide for a change in the Faroese fishing limits. It does, however, renew contacts between industry leaders of the two countries. (United States Embassy, London, October 21, 1965.)

Notes: (1) See Commercial Fisheries Review, May 1964 p. 49.
(2) British £1.00 equal US\$2.80.



France

PROMOTIONAL CAMPAIGN URGES INCREASED FISH CONSUMPTION:

A promotional campaign urging the French people to eat more fish was under way in October 1965 in 17 of the main cities and towns of France. The aim was to help the country's fishermen who were reported experiencing a poor demand for their catches.

By means of special announcements on television and radio, together with newspaper advertisements, it is hoped to persuade the French to eat fish on Tuesdays as well as on Fridays. (Fish Trades Gazette, October 16, 1965.)

FISHERIES EXPOSITION PLANNED IN LORIENT, MAY 12-22, 1966:

An international fisheries exposition is scheduled to be held in Lorient, France, May 12-22, 1966. The exposition is designed to display fishing vessel designs and equipment, including the latest developments in engines, electronics, and refrigeration. Additional information may be obtained from Biennale Internationale des Peches, Chambre de Commerce et d'Industrie, Lorient (Morbihan) France.



German Federal Republic

FISH MEAL MARKET AT HAMBURG, OCTOBER 26, 1965:

The International Fish Meal Export Organization reported the following quotations in Hamburg, Germany, October 26, 1965, for fish meal futures (in dollars per metric ton): US\$190 for supplies afloat; \$193-194 for November 1965; \$191 for December 1965; and \$184-185 for January-June 1966. Hamburg sellers are reluctant to give monthly lots of more than 100 to 200 tons. On the other hand, quotations from Peruvian producers for January-June 1966 are \$191-194. Consuming countries outside West Germany are showing buying interest at those levels for fairly large monthly quantities. (Regional Fisheries Attache, United States Embassy, Copenhagen, November 3, 1965.)

TWO NEW FACTORY TRAWLERS DELIVERED:

Exemplifying the trend towards large factory trawlers in the West German fleet are two new stern trawlers which were delivered in the fall of 1965 to owners at Bremerhaven and Hamburg by Bremerhaven shipyards.

The larger of the two is the Sagitta Maris, a 2,145-gross-ton vessel with an overall length of 78.3 meters (257 feet) powered by a 3,000-horsepower diesel engine giving a top speed of 16 knots.

The Sagitta Maris is an all-welded stern trawler capable of carrying fresh or frozen fish. In addition, the vessel can be equipped for herring fishing. She is designed for operations in either arctic or tropic waters.

In the processing section of the Sagitta Maris, fish are sorted, headed, filleted, washed, and then passed to a battery of vertical plate freezers which have a daily output of 30 metric tons of frozen fillets. The frozen blocks are then stored in the two fish rooms and kept at temperatures as low as -30° C. (-22° F.). Total capacity of the two holds is about 620 tons of frozen fillets. One of the holds is capable of being used as a fresh fish or frozen fish hold and has a capacity of either 165 tons of fresh or 200 tons of frozen fish.

On the factory deck there are three processing lines which include filleting and heading machines for large and small cod and ocean perch. The movement of fish through the processing section is entirely mechanized.

The vessel also has fish oil tanks with a capacity of 80 cubic meters (104.6 cubic yards) and fish meal holds with a capacity of 330 cubic meters (431.6 cubic yards) with reserve space for an additional 30 tons. A full supply of electronic equipment is carried including gyro compass and autopilot, Loran, direction-finder, Echograph, speed and warp speed indicators, two 60-mile-range radars, two fish-finders, one horizontal finder, and radio equipment.

The second vessel, which sailed on her maiden voyage early in October 1965, is the 1,800-ton stern-trawler Hamburg. Main dimensions of the Hamburg are length overall 82.1 meters (269.4 feet), moulded breadth 13.6 meters (41.4 feet), depth 8.3 meters (25.3 feet), and draft 4.3 meters (13.1 feet).

German Federal Republic (Contd.):

Main power unit is a diesel engine of 3,000 horse power at 350 r.p.m. which drives a single propeller to give a speed of about 15.25 knots. Accommodation is for a maximum of 60. The refrigerated fish rooms have a total capacity of about 870 cubic meters (1,137.9 cubic yards) maintained at a temperature of -28°C . (-18.4°F .).

The vessel has an operating range of about 60 days and is fitted with high-powered long-range radio communications apparatus. Her bridge equipment includes gyrocompass with automatic pilot, electric log, echo-sounder, two fish-finders, and two 60-mile radars. (*The Fishing News*, London, October 22, 1965.)



East Germany

DEEP-SEA SUBMARINE OPERATED BY REMOTE CONTROL DEVELOPED:

A submarine for deep-sea fishing has been developed by a ship-designing firm in Stralsund, East Germany. It works by remote control from a parent ship. It can be manned if required and is equipped with hydraulic spars to spread or contract a net in front of it. It is maneuverable and can switch depths quickly.

The fish catch is taken into the net as the submarine moves forward and passes through the net into a container in the craft. Greater catches can be achieved because greater depths can be fished than by conventional methods. An added advantage, according to the designers, is that little noise and wave movement to scare the fish are evident when the submarine is working. (*Fishing News*, October 8, 1965.)



Greece

FREEZER-TRAWLER FISHERY TRENDS, JANUARY-JULY 1965:

Landings: The Greek fleet of Atlantic freezer trawlers landed 14,437 metric tons of frozen fish during January-July 1965 as compared with 11,985 tons in the same period of 1964.

Fleet Expansion: VESSELS ORDERED FROM SOVIETS: A Greek shipowner has ordered 5 factory trawlers from Soviet shipyards at an estimated cost of US\$2.25 million for each vessel. It is understood that the order, arranged through Sudoimport, Moscow, calls for vessels of the "Maiakovskii class" with the following main specifications: length overall 84.7 meters (278 feet), breadth 14 meters (46 feet), depth 5.7 meters (19 feet), main engine 2,000 horsepower, and speed (loaded) 14 knots. Each vessel is to have storage capacity for 750 tons of frozen fish, 60 tons of canned fish, 150 tons of fish meal, and 50 tons of fish oil. The vessels are to be equipped with processing machinery for filleting, canning, and reduction. Freezing equipment on each vessel will include a blast-freezing tunnel with a daily capacity of 15 tons, and 6 horizontal plate freezers with a total daily capacity of 20 tons. The vessels are to be air-conditioned and designed to fish in tropic as well as Arctic areas. Electronic equipment will include radar, echo-sounders, and other fish-finding gear. The vessels should be able to remain at sea for 120 days. Delivery of 2 of the factory trawlers is scheduled for the first half of 1966, with the other 3 to be delivered by the fall of 1967.

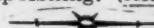
Meanwhile, another Greek factory trawler, the *Rea* (formerly the Soviet *Krylov*) has already begun operations in the Northwest Atlantic off Newfoundland. A Greek firm acquired that vessel from the Soviets and dispatched it to the Atlantic grounds in the summer of 1965 with a mixed Soviet and Greek crew. In late summer 1965, the vessel was reported catching about 10 tons of ocean perch a day, and it was expected to return to Greece in early October 1965 with 600 tons of frozen fish and 100 tons of fish meal.

VESSELS ACQUIRED FROM ICELAND: A Greek operator has acquired three Icelandic steam trawlers. One of those was being rebuilt to serve as a refrigerated transport. It is believed the other two will be used as Atlantic trawlers after being outfitted with freezing equipment. (*Alieia*, August 1965.)

Note: See *Commercial Fisheries Review*, Dec. 1965 p. 55.

SHRIMP FISHING IN PERSIAN GULF:

The Greek freezer-trawler *Evangelistria I* was scheduled to sail in late August 1965 with four shrimp trawlers for the Persian Gulf to begin shrimp fishing. (*Alieia*, August 1965.)



Greenland

SALMON FISHERY TRENDS, OCTOBER 1965:

Inshore: The 1965 Greenland salmon catch in inshore waters should be considerably below the 1,400 metric tons taken in 1964. It was estimated that the Greenland inshore salmon catch did not exceed 770 tons in January-October 1965. During that period in 1964, about 68 percent of the total catch for the year was taken. The decline was due, at least in part to lower prices on the European market for Atlantic salmon on the one hand, and an improvement in the Greenland cod fishery on the other. For example, the average price received by Danish fishermen for salmon in August 1965 was 85 U. S. cents a pound as compared with \$1.32 in August 1964. Greenland salmon face a handicap in some markets because they are a deeper shade of red when smoked than Baltic salmon. However, the Greenland salmon are fatter, and it appears that about 65 percent of Greenland salmon approach the average weight of Baltic salmon which is about 3.5 to 4.5 kilos (7.7-9.9 pounds).

Salmon fishing in the inshore waters of Greenland is practiced in the coastal areas inside the banks along a stretch of coastline running from about latitude 60° N. to 69° N. As the crows flies, the length of that stretch of coastline is about 600 nautical miles, but in actual fact it is much longer because of its many bends, inlets, and fiords. The settled areas are few and far between, and their total number of inhabitants amounts to about 23,000, of which an estimated 11 percent might be classified as salmon fishermen. Others may make occasional catches.

The only fishing vessels available to most of those Greenland fishermen are rowing boats or small open motorboats. The sole equipment used has consisted of set nets reported to have a stretched mesh size of 10-16 centimeters (3.9-6.3 inches) from knot to knot.

Offshore: A Faroese vessel and a Norwegian vessel fished offshore from Greenland with gill nets in 1965. The catch of the Faroese vessel was reported to be 20 tons by November 1965, at which time the vessel was still fishing. The Norwegian vessel returned home with a catch of 12 tons. (Regional Fisheries Attache, United States Embassy,

Copenhagen, October 20, November 4 and 24, 1965; and other sources.)

Note: See Commercial Fisheries Review, November 1965 p. 58.



Honduras

SHRIMP LANDINGS DOWN IN 1965:

Catches of white shrimp during the late summer run were reported down sharply in the Honduran shrimp fishery. According to shrimp packers there, total shrimp landings for 1965 may be only half the quantity landed in 1964.



As of the end of September 1965, there were 30 shrimp vessels operating in Honduran waters--15 of them United States vessels and the remainder Honduran. At the same time a year earlier, 50 shrimp vessels were operating in the same waters. (United States Embassy, Tegucigalpa, November 6, 1965.)



Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, SEPTEMBER 30, 1965:

As of September 30, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 4,129 metric tons, an increase of 321 tons from the stocks on hand August 31, 1965. (United States Embassy, Reykjavik, October 26, 1965.)

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and

Iceland (Contd.):

Icelandic Export Stocks ^{1/} of Principal Fishery Products, September 30, 1965			
Item	Qty.	Value	
		Metric Tons	US\$ 1,000
Groundfish, frozen:			
For export to:			
U. S.	4,129	90.8	2,108.7
Other countries	5,478	94.8	2,201.6
Stockfish	2,500	70.0	1,625.6
Herring, frozen	1,122	6.4	148.6
Industrial products:			
Fish meal:			
Herring	22,658	163.1	3,787.7
Other fish	1,811	12.2	283.3
Herring oil	33,566	278.6	6,470.0

^{1/}Includes only stocks intended for export.

Note: Icelandic kronur 43.06 equal US\$1.00.

slabs, 4,669 metric tons of cod fillets, 2,791 metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.



Ireland

FISH MEAL INDUSTRY
EXPANSION TRENDS:

An Irish company is examining the possibilities of setting up a fish meal factory on the west or northwest coast of Ireland. As existing Irish fish meal factories sometimes have difficulty in obtaining supplies, the company is also considering the purchase of a number of trawlers.

For preliminary test fishing, the Irish firm chartered a Polish "B-25-type" trawler in the fall of 1965 to make a survey of Irish waters and the Atlantic shelf. The Polish vessel was chosen because of its low price, and also because of its apparent suitability for the waters to be investigated. The "B-25," in standard form, has a 15-day range, a cargo capacity of 43 tons, is 81 feet long, and has a beam of 21½ feet.

All the fish caught during the survey were to go to existing Irish fish meal factories.

Meanwhile, a new Irish fish meal plant opened in Millstreet in southern Ireland. That plant is expected to draw supplies from southwest and southern ports. (The Irish Skipper, No. 21, October 1965.)



Ivory Coast

FISHERY TRENDS, JANUARY-JUNE 1965:

Plans of the Ivory Coast Government for development of Abidjan's fishery facilities suffered a temporary setback in the first half of 1965 when invitations for bids for construction of a new 3,000-ton cold-storage facility were withdrawn. However, it was reported that the invitations were to be reissued with an additional proposal for a 50-ton per day tuna cannery. The cannery had previously been planned for a later date. Meanwhile, funds (about US\$2 million) for construction of a second Abidjan fish dock of 430 meters (1,410 feet) were committed. Construction of the new dock, which will double current berthing space, should begin early in 1966.

Landings by the Abidjan-based fleet of about 35 trawlers and 35 purse seiners totaled 21,984 metric tons for the first 6 months of 1965, an increase of 27 percent over the same period in 1964. Of that total, 44.3 tons were shrimp, an increase of 50 percent over the same period in 1964. Although shrimp landings are still small, they are a sign of the growing Ivory Coast shrimp production and the possibility of later exports to the U.S. market. Tuna landings of 6,208 tons in January-June 1965 (mostly for transshipment) were up 11 percent from those in the same period of 1964. Since the second 6 months of the year are traditionally more productive in Ivory Coast fisheries, it can be expected that the total for the year will be substantially greater than for 1964.

An event looked forward to with anticipation by Ivory Coast fishing interests, both Government and private, was the expected arrival in December 1965 of the fisheries research and training vessel President John F. Kennedy, which was financed by the U. S. Agency for International Development. (Fisheries Attache, United States Embassy, Abidjan, October 13, 1965.)



Japan

FROZEN TUNA EXPORTS TO U. S. AND
PUERTO RICO, JULY-SEPTEMBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico in September 1965 dropped 39 percent in quantity and 32 percent in value from those in the previous month.

Japan (Contd.):

Exports to the United States were 19 percent lower than in August. Shipments to the United States were lower for all species of tuna, with the biggest drop in yellowfin exports which were down 32 percent from the quantity shipped in August.

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, July-September 1965

Species	September		August		July	
	Quantity	Value	Quantity	Value	Quantity	Value
	Short Tons	US \$1,000	Short Tons	US \$1,000	Short Tons	US \$1,000
Albacore:						
United States...	2,387	798	2,603	824	4,910	1,424
Puerto Rico...	1,688	501	2,878	825	5,183	1,492
Total.....	4,075	1,299	5,481	1,649	10,093	2,916
Yellowfin:						
United States...	1,460	462	2,159	694	2,361	803
Puerto Rico...	712	400	2,745	843	2,258	637
Total.....	2,172	862	4,904	1,537	4,619	1,440
Big-eyed:						
United States...	2	1	5	1	-	-
Puerto Rico...	100	19	35	7	252	34
Total.....	102	20	40	8	252	34
Total United States	3,849	1,261	4,767	1,519	7,271	2,227
Total Puerto Rico	2,500	920	5,623	1,875	7,441	2,163
Grand total.....	6,349	2,181	10,425	3,194	14,964	4,390

Source: Japan's Bureau of Customs.

The September exports to Puerto Rico were down 56 percent from the previous month. Exports of yellowfin tuna were down sharply--74 percent less than the previous month. Shipments of big-eyed tuna to Puerto Rico in September were about three times the quantity shipped in August. (Fisheries Attache, United States Embassy, November 11, 1965.)

EXPORT VALIDATIONS OF FRESH AND FROZEN TUNA AND TUNA LOINS, APRIL-SEPTEMBER 1965:

Japan's export validations of frozen tuna and cooked frozen tuna loins to the United States and Canada in September 1965 were down 30 percent from the same month in 1964. Albacore and yellowfin tuna accounted for 89 percent of that month's export approvals to those countries. Included in the September 1965 shipments were 2,286 short tons from Japanese transshipment bases including American Samoa.

For the 6 months April-September 1965, Japan's frozen tuna export validations for the United States and Canada (included 5,799 tons from Japanese transshipment bases) were about 2 percent less than in the same 6 months

Japan's Export Validations of Fresh and Frozen Tuna and Tuna Loins by Country of Destination, April-September 1965

Item	To U.S. & Canada		To Other Countries		Total	
	Sept.	Apr.-Sept.	Sept.	Apr.-Sept.	Sept.	Apr.-Sept.
	(Short Tons)		(Metric Tons)			
Albacore, round	5,385	37,602	1,375	5,130	6,260	39,243
Yellowfin:						
Round.....	1,004	3,021	60	96	395	1,757
Gilled & gutted:						
20/100 lbs.	2,472	17,077	785	2,392	3,028	17,884
100 lbs. up	75	1,708	-	-	68	1,550
Dred. with tail	408	4,083	1,586	14,326	1,956	18,031
Fillets.....	-	-	-	-	-	-
Total.....	3,959	26,692	2,431	16,619	5,437	39,228
Big-eyed:						
Dressed.....	381	821	811	5,411	885	5,650
Other.....	4	46	46	424	49	468
Total.....	385	869	857	5,835	934	6,118
Skipjack.....	414	4,475	-	517	375	4,675
Bluefin:						
Dressed.....	-	-	117	2,586	117	2,586
Fillets.....	-	-	75	947	75	947
Total.....	-	-	192	3,533	192	3,533
Loins:						
Albacore....	341	1,543	-	9	310	1,409
Yellowfin...	30	1,055	5	24	32	961
Total.....	371	2,598	5	33	342	2,390
Grand total 1965	10,514	72,236	4,860	31,867	13,546	95,067
Grand total 1964	15,089	74,039	3,858	27,858	17,547	95,026

of 1964. (Fisheries Attache, United States Embassy, Tokyo, November 11, 1965.)

FROZEN ALBACORE TUNA PRICE FOR EXPORT TO U. S. FROM JAPAN PROPER:

The export price of round frozen albacore tuna for shipment to the United States from Japan proper reached in late October 1965 US\$385-390 a short ton c.i.f., and that of frozen tuna loins \$780-800 a short ton. Trade in loins was reported brisk.

Also, towards the end of October the ex-vessel price of albacore at Tokyo climbed to 133-135 yen a kilogram (\$335-340 a short ton) and at Yaizu reached a high of 140 yen a kilogram (\$353 a short ton). It was reported that at those prices Japanese traders would not be able to procure supplies for export to the United States in a large quantity unless export prices climbed up to \$400 a ton c.i.f. (Suisan Tsushin, October 29, 1965.)

ATLANTIC TUNA MARKET AND FISHING TRENDS:

The export market of Atlantic-caught tuna firmed up during August-October 1965. Albacore tuna (frozen round), which at one time sold for US\$270 a short ton f.o.b. Las Palmas,

Japan (Contd.):

as of October 1965 was being exported extensively to Spain for the equivalent of \$340 a short ton f.o.b. Las Palmas. Similarly, the price of dressed big-eyed tuna exported to Italy rose considerably, and Italian tuna buyers in October were willing to pay as much as \$340 a metric ton c.i.f. Italy, or about \$70 a ton more than a few months prior to October. Dressed yellowfin tuna exported to Italy brought the top price of \$450 a metric ton c.i.f. Italy.

The ex-vessel price of dressed big-eyed tuna landed in Japan proper was so high (about 150 yen a kilogram or \$378 a short ton) in October that it would pay for those engaged in the Atlantic tuna fishery to transship their big-eyed catches to Japan. This development in turn served to push up the export price of Atlantic big-eyed. Reportedly, the export price of \$350 a metric ton c.i.f. Italy worked out to about ex-vessel 100 yen a kilogram (\$252 a short ton). The cost of transshipping Atlantic-caught tuna to Japan (including other miscellaneous costs) amounted to about 25 yen a kilogram (\$63 a short ton). On the basis of those figures, the price of Atlantic big-eyed transhipped and landed in Japan amounted to about 125 yen a kilogram (\$315 a short ton), or about \$63 a short ton below the reported prevailing price in Japan of about \$378 a short ton.

A large United States west coast tuna packer had offered to buy 1,500 short tons of Japanese-caught Atlantic albacore tuna for delivery in January 1966. The firm offered to pay the prevailing price in January but attached the condition that Japan pay \$10 a ton of the transportation cost.

This offer is the first of its kind received by Japan since Japan decided to adopt a policy of seeking to redistribute the supply of Atlantic albacore to markets other than Puerto Rico so as to avoid supply gluts (such as that which occurred in 1964 at Puerto Rico) and to assess industry members a fee to defray part of the increase in transportation costs. Frozen tuna prices firmed up and supplies were short. With fewer vessels operating in the Atlantic and Spanish market demand increasing, there does not seem to be any foreseeable marketing problem. The Japanese trading firms felt strongly that they should not, at that time, accept the offer.

Japanese albacore fishing in the Atlantic Ocean continued good during October in the vicinity of 30° N. latitude and 20°-30° W. longitudes, with daily catches ranging between 3.5-5 metric tons a vessel. Over one-half of the landings made in October were sold to Spain at frozen round c.i.f. prices of US\$420-430 a metric ton (said to equal \$330-335 a short ton f.o.b. Las Palmas). As per the last week in October, over 5,000 metric tons of albacore were estimated to have been contracted for sale to Spain.

While it was not known how much longer albacore tuna exports to Spain would continue in 1965, Japanese tuna suppliers were of the opinion that further purchase offers from that country for fairly large quantities could be expected since Spain's tuna requirements definitely have not been met; hence, they expected the albacore export market to continue firm for some time. (Suisan Tsushin, October 22, 25, 27, & 28, 1965.)

CANNED TUNA IN BRINE SALES TO U.S.:

The Japan Canned Tuna Sales Company announced October 22, 1965, that a total of 280,000 cases of canned tuna in brine (230,000 cases of whitemeat tuna and 50,000 cases of lightmeat) for export to the United States was to be offered for the October sale. The promotional allowance for the whitemeat pack (US\$0.50 a case) was to be the same as in the previous sales, but the premium on the lightmeat 7-oz. and 13-oz. packs was raised by 100 yen (\$0.277) to 200 yen (\$0.55) a case. Closing date for the sale was announced as October 28. (Katsuo-Maguro Tsushin, October 25, 1965.)

INDUSTRY OFFICIAL'S VIEW ON U. S. TUNA TOUR:

The Japan Canned Foods Exporters Association's Vice President returned to Japan October 13, 1965, after attending the New York City Japanese tuna conference (September 30-October 1). He was one of the 14 Government-industry representatives who participated in the New York tuna conference sponsored by the Japanese Ministry of International Trade and Industry. His comments on the recent U. S. tour were as follows:

The New York conference was held in the form of a briefing session, with local Japanese

Japan (Contd.):

trade representatives explaining developments to the group (consisting of representatives from the Japanese Government, canned food exporters, food packers, frozen food producers, and can manufacturers). The conference was significant and left a strong impression with the attendants that similar meetings should be held again in the future.

Members of the party met and spoke with local American importers, who requested that Japan supply canned tuna, particularly lightmeat tuna, on a continuous basis. They cited instances of heavy shipments during the slow year-end season and occurrences of supply shortages during the important Lenten season, and strongly urged that such things do not happen again. They also pointed out the quality deterioration of Japanese products. The resident Japanese trade representatives expressed the desire that particular attention be given to the quality of institutional tuna packs. American importers and resident Japanese traders agreed that excess competition among Japanese trading firms has disappeared and that the big problem now was competition with the products packed by major U. S. packers.

The group visited Puerto Rico. We were all impressed by the equipment and efficient operations of the local tuna canneries, fish unloading facilities, cold storages, and receiving and shipping plants. We felt we have much to learn from their rationalization efforts. Two canneries were busily packing tuna in brine.

Owing to shortage of Japanese canned lightmeat tuna, 2 or 3 Japanese trading firms were reported buying U. S. products to fill the gap.

The present canned tuna sales system should be continued and sales should be expanded within the framework of that system. In the last three months or so, measures have been adopted whereby trading firms have been able to sell any quantity they ordered as long as supplies were available and, at the same time, avoid excessive competition. Should excessive competition occur, it may be necessary to strictly enforce the administration of the Exporters Agreement but, at the present time, we wish to see the adoption of flexible measures which will help expand sales. In this context, we would like to see the Agreement extended through March 1966. (Note: Present Agreement expired November 1965.)

Brands are an important factor in the sale of small-size canned tuna on the U. S. market. In the case of Japanese products, advertised brands handled by 3 or 4 trading firms are gaining more shelf space, although they still do not have the power to produce volume sales. Therefore, to increase sales, their production costs would have to be reduced to the level where they can be sold at the price of private labels.

The production ratio between canned white-meat tuna and canned lightmeat tuna should not be drastically changed. Canned whitemeat tuna will not sell well in a predominantly lightmeat tuna market. We should not allow the U. S. market for Japanese canned lightmeat tuna, which Japan has built up so far, to vanish. (Suisan Tsushin, October 15, 1965.)

TUNA PURSE-SEINING TO BE TRIED NEAR GUAM:

A joint experimental tuna purse-seine operation in the central west Pacific by the two Japanese purse seiners Kenyo Maru (240 gross tons) and Taikei Maru No. 23 (212 gross tons) was planned by their owners. The two vessels expected to fish off Guam Island from late 1965 until the end of February 1966 to determine the feasibility of establishing a year-round purse-seine fishery in the central west Pacific. Both the Kenyo Maru and the Taikei Maru were equipped with power blocks. (Shin Suisan Shimbun Sokuho, October 19, 1965.)

GOVERNMENT TAKES DIM VIEW OF INDUSTRY'S TUNA FISHERY RATIONALIZATION PROPOSALS:

The Japanese Fisheries Agency is studying the establishment of a semigovernment corporation proposed by the National Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN) to help the depressed tuna fishery. But the Government is reluctant to approve that plan in its present form. Under NIKKATSUREN's plan, the corporation would systematically carry out fleet reduction by liquidating fishery enterprises considered hopeless of financial recovery and assist tuna vessel owners in modernizing their vessels and in rationalizing their management. An estimated nine billion yen (US\$25 million) needed to operate this corporation would be financed entirely by the Government. Reportedly, the Agency's

Japan (Contd.):

basic attitude towards NIKKATSUREN's plan is as follows:

(1) The Government cannot consider bearing the full financial burden of the corporation. (2) Extension of interest-free loans for modernizing fishing vessels and rationalizing fishery management will create problems, although financial assistance should be provided within the existing framework of the law. (3) Payment of separation allowances to vessel crews affected by the vessel reduction plan will present problems. (4) Rehabilitation loans should not be granted to vessel owners other than those afflicted by sea disaster. (Minato Shimbu, October 23, 1965.)

CRAB MEAT EXPORTS, SEPTEMBER 1965:

Japanese exports of canned crab meat in September 1965 amounted to 66,308 cases (48 $\frac{1}{2}$ -lb. cans) as compared with 77,702 cases during the previous month and 70,534 cases in September 1964. Of the total canned crab meat exports in September 1965, 14,645 cases were shipped to the United States, 13,700 cases to the United Kingdom, 3,215 cases to Canada, and 34,748 cases to other countries.

In September 1965, king crab meat exports amounted to 43,727 cases or 66 percent of total canned crab meat exported. Of the total king crab exported in September 1965, 11,472 cases went to the United States, 11,025 cases to the United Kingdom, and 21,230 cases to other countries.

The September 1965 Japanese canned crab meat exports also included: Kegani crab--9,516 cases of which 2,423 cases went to the United States; Zuwai crab--13,015 cases of which 750 cases went to the United States; and 50 cases of Hanasaki crab. (Fisheries Attache, United States Embassy, Tokyo, October 22, 1965.)

CANNED SHRIMP EXPORTS, SEPTEMBER 1965:

Japan's exports of canned shrimp (24 $\frac{1}{2}$ -lb. cans) during September 1965 were very light, falling far below those in August 1965 and September 1964. Limited shrimp fishing in the Bering Sea was said to be the reason

Japan's Exports of Canned Shrimp by Country of Destination, August and September 1965 with Comparisons

Country of Destination	1965		1964	
	Sept.	Aug.	Sept.	Aug.
	... (Cases of 24 $\frac{1}{2}$ -lb. Cans) ...			
United States	3,000	5,600	16,275	26,146
United Kingdom . . .	3,000	19,870	37,100	16,790
Canada	5,900	5,600	6,836	6,002
Other	2,900	8,315	5,358	1,604
Total	14,800	39,385	65,569	44,542

for the decline. (Fisheries Attache, United States Embassy, Tokyo, October 22, 1965.)

EXPORT PRICES OF CANNED SARDINE AND MACKEREL RAISED:

The Japan Canned Sardine and Saury Packers Association, at the October 21, 1965, directors' meeting, voted to raise the export prices for canned mackerel and sardine. The

Japanese Canned Sardine and Mackerel Export Prices, f.o.b. Japan (Previous prices shown in parentheses)

Japanese Can and Case Size	Equivalent U.S. Can Size	Price Per Case		Country of Destination
		Yen	US\$	
Sardines in tomato sauce:				
No. 1 oval (24 cans)	1-lb. oval (24's)	1,450 (1,325)	4.03 (3.68)	United States
No. 3 oval (48 cans)	1/2-lb. oval (48's)	1,575 (1,525)	4.38 (4.24)	" "
No. 1 oval (24 cans)	1-lb. oval (24's)	1,400 (1,275)	3.89 (3.54)	Other Countries
No. 3 oval (48 cans)	1/2-lb. oval (48's)	1,525 (1,475)	4.24 (4.10)	" "
No. 1 small (100 cans)	5-oz. tall (100's)	2,350 (2,300)	6.53 (6.11)	" "
No. 4 (48 cans)	1-lb. tall (48's)	2,500 (2,300)	6.94 (6.11)	" "
Mackerel in tomato sauce:				
No. 1 oval (24 cans)	1-lb. oval (24's)	1,175 (1,125)	3.26 (3.13)	Other Countries
No. 3 oval (48 cans)	1/2-lb. oval (48's)	1,350 (1,250)	3.75 (3.47)	" "

new prices for canned sardine went into effect immediately, while those for canned mackerel became effective November 1. (Suisan Tsu-chin, October 23, 1965.)

FROZEN SWORDFISH EXPORT VALIDATIONS TO THE U. S. AND CANADA, APRIL-SEPTEMBER 1965:

Japanese export validations of frozen broadbill swordfish (mostly fillets and chunks) to the United States and Canada in September 1965 totaled 591 short tons valued at US\$479,857. This compared with approvals of 569 tons valued at \$438,551 in the previous month and 569 tons valued at \$343,569 in September 1964.

Japan (Contd.):

For the 6 months April-September 1965, Japan's export validations of frozen swordfish to the same countries totaled 2,285 tons valued at \$1.7 million. Fillets of that species accounted for 66 percent of the total, with the remainder consisting of chunks and swordfish processed in other forms. For the same 6 months in 1964, the frozen swordfish export approvals totaled 1,723 tons valued at \$984,655. (Fisheries Attache, United States Embassy, Tokyo, November 2, 1965.)

EXPORTS OF FROZEN RAINBOW TROUT, SEPTEMBER 1965:

Japan's exports of frozen rainbow trout in September 1965 were up 23 percent in quantity and 20 percent in value from the previous month's exports. As in August, the United States was the principal buyer of Japanese

Japan's Exports of Frozen Rainbow Trout by Country of Destination, September 1965 with Comparisons						
Destination by Country	September		August		July	
	Qty.	Value	Qty.	Value	Qty.	Value
	Short Tons	US\$	Short Tons	US\$	Short Tons	US\$
United States . . .	131	97,869	108	82,042	112	79,731
United Kingdom . .	41	25,500	32	21,155	29	18,994
Belgium	11	7,903	14	11,547	27	22,575
Canada	26	19,447	11	7,792	29	20,589
Australia	2	1,689	5	4,142	1	1,114
Other	18	13,411	16	11,233	2	1,712
Total	229	165,819	186	137,911	200	144,715

Source: Japan's Bureau of Customs.

frozen rainbow trout, accounting for 57 percent in quantity and 59 percent in value of the total September 1965 exports. (Fisheries Attache, United States Embassy, Tokyo, October 20 and November 9, 1965.)

EXPORTS OF FROZEN FISHERY PRODUCTS OTHER THAN TUNA, APRIL-SEPTEMBER 1965:

Japanese exports of frozen fishery products (excluding tuna) in April-September 1965 amounted to 12,391 short tons valued at US\$4.1 million. Of that total, 1,431 tons valued at a little more than \$1.2 million were exported to the United States. Principal items shipped to the United States were frozen rainbow trout (356 tons, value \$274,000), swordfish steaks (277 tons, value \$245,000), shrimp (155 tons, value \$243,000), and frog legs (140 tons, value \$199,000).

Exports to countries in West Africa during the period totaled 4,082 tons valued at \$497,000, made up completely of overseas trawl fish. Shipments to other principal countries included South Africa with 1,596 tons valued at \$250,000 (overseas trawl fish); Australia, 949 tons valued at \$468,000 (mostly overseas trawl fish, some cod, shrimp, and oysters); and United Kingdom, 563 tons valued at \$558,000 (shrimp, rainbow trout, some salmon, overseas trawl fish). (Fisheries Attache, United States Embassy, Tokyo, November 2, 1965.)

POOR 1965 SAURY SEASON FORECAST:

The 1965 saury fishery in Japan continued extremely poor as of the latter part of October 1965. It is forecast that the season's total catch may fall far below the poor season of 1964, when landings totaled about 200,000 metric tons. In 1963 the saury catch totaled 384,000 tons; in 1962, 483,000 tons. Light landings in early October at one point forced ex-vessel prices up to a high of 180 yen a kilogram (US\$0.227 a pound). Fishing improved for a few days in mid-October, with about 6,000 tons landed, and prices dropped to 20-40 yen a kilogram (\$0.025-0.05 a pound). (Suisan Keizai Shimbun, October 22; Suisan Tsushin, October 21, 1965.)

(Note: About 500 Japanese fishing vessels were reported fishing for saury in 1965. The Soviet Union is also engaged in this fishery, having entered it about seven years ago. The Soviet fleet (exact size not known but Japanese sources indicate fleet to be large) starts fishing for saury off the Kurile Islands about a month before the season opens in Japan, following the schools southward. In 1964 and again in 1965, Soviet fishing vessels were sighted operating as far south as the waters off Kinkazan (38° 15' N. latitude), northeastern Japan.

In addition to the Soviet Union, the Republic of Korea (ROK) has entered the saury fishery. The Korean fleet in 1965 consisted of two 80-ton fishing vessels and a 180-ton carrier vessel. The vessels operated out of Onahama, Fukushima Prefecture. The two fishing vessels reportedly were constructed at Onahama and exported to South Korea.

- The entry into the saury fishery by the Soviet Union and South Korea (but especially the Soviet Union with her large, efficient fishing

Japan (Contd.):

vessels), the appearance of the Soviet fleet farther south each year near grounds traditionally fished by Japanese fishermen, the possibility that both the Soviet Union and South Korea may increase their fleets in the future, the failure of the Japanese saury fishery in 1964, and prospects of a worse season in 1965 do not present a very bright picture for Japanese saury fishermen.

The poor saury season is also expected to work difficulties on the Japanese tuna fishermen. Saury are used extensively as bait by the tuna long-line fishermen (the annual demand of which is estimated at 40,000-60,000 metric tons by one periodical), who will, as in 1964/65, be compelled to pay high prices for saury bait. Due to the shortage and high price of bait saury, some long-line fishermen early in 1965 experimented with small mackerel, which proved quite satisfactory.)

BERING SEA FISHING TRENDS:

The 11,500-ton Japanese factoryship Tenyo Maru ended operations in the Bering Sea on October 3, 1965, and returned to Yokohama October 15. The factoryship produced 5,574 metric tons of minced fish meat and 4,781 tons of fish meal. The minced meat was contracted for sale at over 100,000 yen (US\$278) a metric ton and the fish meal 73,000 yen (\$203) a ton. (Suisan Tsushin, October 7 & 15, 1965.)

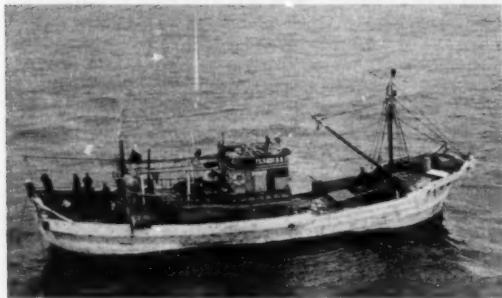


Fig. 1 - Japanese trawler fishing in the Bering Sea for the factoryship Tenyo Maru.

Another Japanese firm is reported planning to install on its fish meal factoryship Gyokuei Maru (10,357 gross tons) equipment to process about 30 metric tons of minced

fish meat a day. That firm is also planning on sending the factoryship to the Bering Sea earlier in the season, about March of 1966. (Shin Suisan Shimbun Sokuho, October 9, 1965)



Fig. 2 - Nets used by a Japanese trawler in the Bering Sea.

The factoryship Chichibu Maru (7,472 gross tons) ended fishing operations in the Bering Sea on October 15. The factoryship was scheduled to arrive in Hakodate October 22-23 with about 4,500 metric tons of processed fish, mainly Pacific ocean perch. (Suisan Tsushin, October 19, 1965.)

VIEWS ON NORTH PACIFIC WHALE STOCKS:

In preparation for the 4-nation North Pacific whale conference (Japan, U.S.S.R., Canada, and the United States) scheduled to convene in Honolulu in early 1966, Japan is consolidating its views on the state of the North Pacific whale resources. Opinion reportedly is that the condition of the North Pacific whale stocks is such that prompt measures must be taken to protect the resources. On October 12, 1965, the Director of the Japan Whale Research Institute expressed the following views on the need to restrict whaling operations in 1966:

"It may be said that the problem of the North Pacific whale stocks concerns only Japan and the Soviet Union. We are now studying Soviet catch data which the Russians finally forwarded to Japan in June this year. According to their data, considerable quantities of humpback and fin whales have been taken

Japan (Contd.):



Fig. 1 - Japanese whale catcher boat in North Pacific.

by the Soviet Union. With regard to humpback whales, the Scientific Committee on North Pacific Whales has recommended that the capture of that species be prohibited for one year in 1966 and that subsequent recommendations be made after assessing the results of that measure. The fin whale stock has declined considerably, so I believe further catch reduction is necessary. That leaves us with the sei whales, but that stock also shows a declining trend. The North Pacific whales should be considered as having declined in abundance commensurate to the increased catches made by the two additional Soviet whale fleets. Depletion of whale stocks

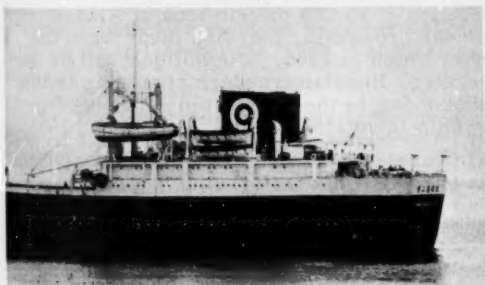


Fig. 2 - Japanese whale factoryship operating in North Pacific.

would also adversely affect the Soviet Union so it is most important that both Japan and the Soviet Union reach accord at the forthcoming scientific meeting. In working out arrangements, it is desirable that catch limits be set according to species. It will probably be difficult for Japan to continue harvesting whales in the quantity taken this year.

North Pacific whaling involves operations from land stations, which makes it more complex than the Antarctic operations." (Suisan-cho Nippo, October 13, 1965.)

NORTH PACIFIC SPERM WHALE STUDY:

The Japan Whale Research Institute, in cooperation with a large Japanese fishing company, undertook a sperm whale study in fall 1965 to establish a scientific basis for supporting Japan's proposal to relax the size restriction (imposed by the International Whaling Commission) on harvestable sizes (over 35 feet) of sperm whales. It is reported that four whale catchers (belonging to the fishery firm), operating under contract to the Whale Institute, assembled off eastern Hokkaido and on September 29 located a herd of 25 sperm whales eight miles off Akkeshi. The catchers simultaneously closed in on the herd and killed 21 whales, one of which was not recoverable. The 20 whales were hauled to Akkeshi where they were examined as to length, sex, and sexual maturity. The 20 whales consisted of 16 females, 3 males, and 2 calves (one of which was lost at sea).

The whaling expedition to collect scientific data is reported to be the first of its kind undertaken by any nation. Another expedition is expected to be launched in or after 1966.

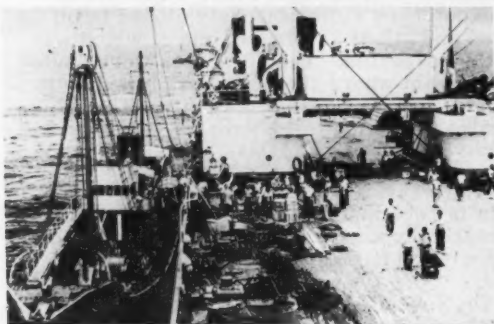
On November 10, 1965, the Japan Whale Research Institute and the fishing company presented a report on their findings to a group of 20 government and industry officials. The study revealed that (1) sperm whales are still abundant, (2) whale herds differ in size and sexual composition (although the species is polygamous in nature), (3) females below the present minimum harvestable size limit (35 feet in case of base-type whaling operations) are sexually capable of reproduction, and (4) natural mortality appears high.

It was reported that the findings lend support to Japan's claim in seeking a relaxation of international whaling regulations. However, it was decided at the meeting that conclusions should not be hastily drawn on the basis of the one study conducted to date and that further studies should be undertaken. (Suisan Keizai Shimbun, October 8 and November 10, 1965.)

Japan (Contd.):

ANTARCTIC WHALING OPERATIONS AND OUTLOOK FOR 1965/66 SEASON:

The three Japanese whaling firms scheduled to participate in the Twentieth (1965/66) Antarctic Whaling Expedition were to operate a total of 5 whaling fleets, 2 less than on the Nineteenth (1964/65) Expedition. Owing to the reduction of the international catch quota to 4,500 blue-whale units for the 1965/66 Antarctic whaling season, as compared with 8,000 blue-whale units for 1964/65 informally agreed to by the four whaling countries (Japan, Soviet Union, Norway, the Netherlands), Japan's national quota (52 percent) for the 1965/66 season is 2,340 blue-whale units; in the 1964/65 season it was 4,160 blue-whale units. (*Suisan Keizai Shimbun*, October 18, 1965.)



Japanese whale catcher alongside factoryship to receive supplies and fuel.

To compensate for those cuts, Japan is striving to increase its catching and processing efficiency on the whaling grounds. This season, the Japanese fleets include a larger proportion of catcher vessels and freezer-ships. Japanese whaling companies plan to increase their yield per whale by processing whale meat to the fullest extent possible. The fleets will concentrate on catching sei whales for their high meat yield. The catch of sperm whales (used mainly for oil extraction) will be kept at a low level.

The five Japanese Antarctic whaling fleets departed in late October 1965 for the whaling grounds which were scheduled to open December 12, 1965. The production goals in 1965/66 for the Japanese Antarctic whaling fleet are 47,109 metric tons of baleen whale oil, 450 tons of sperm oil, 106,854 tons of

frozen whale meat, 3,827 tons of salted whale meat, 2,496 tons of fish meal, and 250 tons of whale extract.

The Japanese expect good prices for both whale oil and whale meat in 1966, and estimate that the value of a blue-whale unit taken in the 1965/66 Antarctic season will be 7.5 to 8 million yen (US\$20,800 to \$22,200) as compared to 6 million yen (\$16,700) in the previous season.

The motherships in the Japanese 1965/66 Antarctic fleet are the 16,810-ton *Nisshin Maru*, the 23,406-ton *Nisshin Maru No. 3*, the 19,319-ton *Tonan Maru*, the 13,815-ton *Tonan Maru No. 2*, and the 20,300-ton *Kyokuyo Maru No. 3*. The fleet also includes 13 freezer vessels (ranging from 3,846 to 11,193 gross tons), 20 carrier vessels (958 to 7,492 gross tons), 4 tankers (12,048 to 13,156 gross tons), 44 catcher vessels (375 to 758 gross tons), and 8 search or collection vessels (399 to 723 gross tons). (*Nihon Keizai*, October 19, 1965.)

Note: See *Commercial Fisheries Review*, October 1965 p. 91; August 1965 p. 85; and June 1965 p. 44.

POLLOCK TO BE IMPORTED FROM U. S. S. R.:

The Japanese Ministry of Agriculture and Forestry announced on October 7, 1965, that the Government had decided to permit the importation of 45,000 metric tons of Alaska pollock for processing into fish meal from the Soviet Union in 1966. The pollock will be delivered by Russian trawlers operating in the Okhotsk Sea to the 14,000-ton Japanese factoryship *Hoyo Maru*.

In January-March 1965, the Japanese firm that operates that factoryship had purchased about 36,000 tons of Alaska pollock from Soviet trawlers. Subsequently, the same firm as well as several others submitted applications to the Government to import in 1966 over 100,000 tons of pollock. This move was strongly opposed by the land-based fishermen and processors in Hokkaido. Settlement of the issue was on a political level. (*Suisan Keizai Shimbun*, October 12, 1965, and other sources.)

Note: See *Commercial Fisheries Review*, November 1965 p. 67; October 1965 p. 83.

Japan (Contd.):

JAPAN-COMMUNIST CHINA FISHERY AGREEMENT TO BE RENEGOTIATED:

The Japan-Communist China Private Fishery Agreement, a two-year pact concluded November 8, 1963, to regulate Japanese and Communist Chinese fishing activities off the mainland China coast, was scheduled to be renegotiated in Peiping, China, in late November 1965. On October 20, the Communist Chinese Fishery Association informed the Japan-Communist China Fishery Association of Japan that it considered the Agreement inadequate in protecting fishery resources and requested that negotiations be held in Peiping in late November. The Japanese Association met October 28 and selected a delegation of 10 members to represent Japan at that conference. (Suisancho Nippo, October 30; Min-aio Shimbun, October 21, 1965.)

GOVERNMENT TO COMPENSATE FISHERMEN FOR VESSELS SEIZED BY SOUTH KOREA:

The Japanese Fisheries Agency and the Finance Ministry, which have been conferring on measures to provide financial assistance to fishing vessel owners who suffered losses as a result of having their vessels seized by South Korean patrol boats, reached agreement on the amount of compensation and method of compensating vessel owners. The proposed funding measures were formally adopted at an October 22, 1965, Cabinet meeting.

- (1) The Government will appropriate a sum of 4,000 million yen (US\$11 million) in the supplementary budget as a special aid fund.
- (2) The Agriculture-Forestry-Fisheries Cooperative Bank will make available a total of 1,000 million yen (\$2.8 million) for long-term, low-interest loans to affected vessel owners.
- (3) The Government will give special tax consideration in matters involving special financial assistance given to the fishermen.
- (4) Sums already paid by the Government to vessel owners in the form of insurance payments will be deducted from the total com-

pensation fund. (Suisan Tsushin, October 23, 1965.)

REPORT ON OVERSEAS FISHERY INVESTMENTS:

The Japanese Fisheries Agency released in October 1965 a 77-page report on the status of Japanese investments in overseas fishery enterprises. The report reveals that Japanese fishery investments in foreign countries as of March 1962 amounted to 1.5 percent of total Japanese overseas capital investments in production enterprises. Mining investments led all overseas investments with 48 percent, followed by lumber with 14 percent. Capital investments in overseas fishery enterprises presently total in value about 20,000 million yen (US\$55.6 million) invested by 19 Japanese companies in 28 cooperative fishery enterprises in 22 foreign countries. Japan's capital investments in the 28 cooperative enterprises average in value over 70 million yen (US\$194,444) per enterprise (45 percent in capital goods) and investment share per enterprise about 61 percent.

Of the 28 cooperative fishery enterprises, 11 (40 percent) are located in South and Central America, 10 (35 percent) in Southeast Asia, 3 (10 percent) in Africa, and 4 (15 percent) in other areas. The 28 enterprises operate a total of 76 fishing vessels, consisting of 51 (67 percent) trawlers mostly in the 50- to 100-ton class; 17 (22 percent) tuna vessels in the 50- to 500-ton class; 6 whale catchers; and 2 other fishing vessels. A total of 42 vessels (including 30 trawlers and 9 tuna vessels) operate out of Central and South America; 26 vessels (20 trawlers and 6 tuna vessels) operate out of Southeast Asia; 3 vessels out of Africa; and 5 (all whalers) from other areas. Of the 76 vessels, 28 vessels (37 percent) were built by or imported from countries other than Japan, 16 vessels (21 percent) imported from Japan, 14 vessels (18 percent) financed by Japan, and 18 (24 percent) chartered from Japan.

Production in 1964 of those overseas enterprises (for which catch data are available) engaged in fishing operations totaled 27,396 metric tons, declining slightly from 1963's production of 28,460 tons. Production of trawl-caught fish, for the second successive year, declined slightly, totaling 13,630 tons as compared to 1963 landings of 14,275 tons. Tuna

Japan (Contd.):

production, which totaled 1,248 tons in 1960, reached a peak of 9,151 tons in 1963 but declined drastically (34 percent) in 1964 to 6,053 tons. Shrimp production, which totaled 347 tons in 1961, jumped from 5,034 tons in 1963 to 7,714 tons in 1964, up 53 percent. The harvest of whales in 1964 totaled 1,184 whales as compared to 850 whales in 1963.

With respect to the financial condition of the overseas enterprises, the Agency's report shows that returns from investments are still very small. Financial reports submitted to the Agency by 23 enterprises showed that in 1964 only 11 firms recorded a profit (after deducting depreciation), and among those 11 firms only three declared dividends and remitted an estimated 3 million yen (US\$8,333) to Japan. The financial status of five enterprises is unknown due to the fact that some of them are not yet in operation or have suspended operations. (Source: Present Status of Japanese Overseas Capital Investments in Cooperative Fishery Enterprises, Production Division, Japanese Fisheries Agency, October 1965.)

SCIENTISTS SEE NEED TO RE-EXAMINE DISTANT-WATER FISHERIES POLICY:

It is reported that an increasing number of Japanese scientists are beginning to feel that the present Japanese Government fishery policy on distant-water fisheries cannot cope with changes occurring in those fisheries, which rapidly developed after the war and which subsequently have undergone tremendous structural changes. They are said to feel that the continued administration of measures based on the existing policy has arrested Japan's growth of the distant-water fisheries and there is a definite need to re-examine and clarify policies for those fisheries from a fresh and different point of view. These views cropped up at the meetings sponsored by the Japan Fishery Resource Conservation Association.

The views of the scientists are shared by some members of the Government. Industry is also moving in this general direction, as witnessed by the developments in Japan related to the promotion and stabilization of Japan's international fisheries. (Katsuo-Maguro Tsushin, October 29, 1965.)

VESSEL MANAGEMENT AND OPERATION TRENDS, FY 1964:

The Statistics and Survey Division of the Japanese Ministry of Agriculture and Forestry released in October 1965 a preliminary report on fishery statistics for fiscal year 1964 (April 1964-March 1965) showing trends in management, vessel operations, and labor employment. According to that report, Japanese fishery enterprises numbered 297,087 management units, declining 8,284 units or 2.7 percent from fiscal year 1963. The decline occurred in enterprises operating without fishing vessels, enterprises operating unpowered vessels, those operating 1- to 3-ton and 5- to 30-ton powered vessels, and in the beach-seine fishery. Fishery enterprises which increased in number were those employing 3- to 5-ton, 100- to 200-ton, and over 500-ton powered vessels, as well as those engaged in shallow-seas culture fisheries (primarily seaweed culture). The survey showed that withdrawals from the fisheries are continuing as in earlier years at a high rate rarely observed in any other industry. In agriculture, another primary industry which is always used for comparison, withdrawals are also high but the number of farming families has not shown a declining trend. In the fisheries, the decline in management units was greatest in the unpowered vessel category, where the decrease totaled 8,415 units. However, this decline was due in large part to management units installing outboard motors on their vessels, as in the shallow-seas culture fisheries.

Essentially, the survey revealed the following trends in fishery management:

Decrease in management units: (1) Among the family-type managements, on the whole, those in the category employing vessels in the fishery showed a large decrease. A particularly large decrease occurred in the unpowered vessel category where the decline totaled 8,415 management units (14 percent). This was due, in addition to such factors as withdrawals and transfers, to vessel reclassification resulting from conversion to powered vessels. The reduction of 2,328 management units (5 percent) in the category of enterprises not operating vessels, such as those engaged in shellfish and seaweed collecting, largely contributed to the decline in family-type managements. (2) The beach-seine fishery showed a steady decline, the number of management units dropping to 1,616 units in fiscal year 1964. This is less than half the

Japan (Contd.):

number in operation in 1953. (3) Enterprises operating powered vessels over 10 gross tons primarily for distant-water fishing generally showed an increase over 1963, but those operating 10- to 30-ton and 200- to 300-ton vessels declined somewhat.

Increase in management units: Enterprises showing an increase were those in the categories of powered vessels under one gross ton, and powered vessels of 30-200 tons and over 500 tons, as well as those engaged in shallow-water fish culture (primarily seaweed culture). (1) The increase in management units operating powered vessels under one ton was due primarily to vessel transfers to this category from the category of unpowered vessels as a result of extensive use of outboard motors. (2) The increase shown in the category of 3- to 5-ton powered-vessel operators, along with the increase in under 1-ton powered-vessel operators, represents an unusual trend in family-type operations, which have shown a decline in all other categories. The number of management units in that category, totaling 14,450 units, represents an 80-percent increase over 10 years ago. (3) Management units in the category of 30- to 200-ton powered-vessel operators engaged in offshore or distant-water fisheries, which had shown a declining trend in earlier years, showed a slight increase in 1964. (4) Management units in the category of over 500-ton vessels operating primarily in distant-water fisheries showed an annual increase--the number of units in 1964 totaled 329. (5) The number of shallow-seas culture enterprises has annually increased, totaling 70,200 units in 1964, close to a threefold increase over 1953. (Suisan Keizai Shimbun, October 27, 1965.)

ONE-PERCENT TAX ON EXPORTS TO NIGERIA:

The Japanese Government has decided to levy a one-percent assessment on Japanese exports to Nigeria and to use the revenue to promote imports of Nigerian products. This measure was developed as a result of the Nigerian Government's adoption of a policy to prohibit entry of Japanese products unless Japan took steps to promote imports from Nigeria. It was reported that the Japanese Government will not issue export licenses to

those firms engaged in trade with Nigeria unless they pay this assessment.

The one-percent levy is expected to greatly affect the Japanese trawl operators inasmuch as Nigeria is an important market for Japanese Atlantic trawl-caught fish. In Fiscal Year 1964 (April 1964-March 1965) Japan's export of trawl-caught fish to Nigeria totaled 14,413 short tons, valued at US\$2,037,314, far surpassing exports to other countries. (Suisan Tsushin, November 2, 1965.)

RADAR-BUOY FOR TRACKING FISHING GEAR AT SEA:

A Japanese firm has developed a radar-buoy with which a fishing vessel can locate fishing nets, long lines, and other vessels. The device is made so that the buoy receives impulses transmitted by a radar and sends them back to a vessel's receiving set. Therefore, a net or fishing line marked at sea with the buoy can be relocated by radar. The current source of the buoy is set so that it works only when a radar is transmitting. Thus one battery for the buoy will last 150 hours.

The price is 200,000 yen (US\$556) for the buoy, and 600,000 yen (\$1,667) for the receiving set and adjuster for the vessel.

The Japanese firm developing the radar-buoy has also developed a small or medium-size marine radar which it claims is almost equal in capacity to larger radar equipment. By using a variable sweep apparatus in the new radar, a distance 50 percent greater than the graduated distance can be detected. The maximum range claimed for the new radar is 75 nautical miles. If an off-center apparatus is used at the same time, it is said to be possible to shift the center of the reflection so that a sphere three times as large as the field can be caught. The new radar is priced at 2 million yen (\$5,556) for an alternating-current radar and 2.2 million yen (\$6,111) for a direct-current unit. (Nihon Keizai, November 10, 1965.)

FISH-FINDER FOR TRAWL GEAR DEVELOPED:

A new wireless remote-control fish-finder for deep-water trawling, reputed to be the first of its kind has been developed by the

Japan (Contd.):

Furuno Electric Company of Japan. The equipment consists of a 200-kilocycle ultrasonic wireless transmitter (attached to the trawl net) which probes the adjacent area and transmits signals to the trawl vessel through a 50-kilocycle ultrasonic receiver, which is towed ahead of the net. Readings are taken by a recorder on the vessel. This new gear (which is said to enable continuous shipboard observation of fish entering the net, condition of net, obstacles, and clearance of the net above the bottom) was tested successfully by several large Japanese stern trawlers operating in the North Pacific Ocean. It is reported that use of this equipment makes it possible to eliminate net damages caused by over-catch, reduce operating time, avoid snagging, as well as recover lost nets (by tracing signals). The gear, which is made to withstand water pressure to a depth of 1,200 meters (3,936 feet), has a range of 2,000 meters (6,560 feet), and is said to perform without fault at vessel speeds of up to 8 knots. (Suisan Keizai Shimbun, October 21, 1965.



Republic of Korea

TUNA FLEET EXPANSION
CAUSES CONCERN IN JAPAN:

Japanese tuna industry circles are concerned about the possibility of fishing competition, particularly in the Atlantic, from South Korea's expanding tuna fleet, according to an article in the Japanese periodical Nihon Keizai, October 31, 1965. The article stated:

- (1) At least 21 tuna vessels are being built in South Korean shipyards with financial aid from United States interests.
- (2) At least 76 tuna vessels are to be imported by South Korea from a French-Italian group.
- (3) Many of the new Korean vessels are expected to enter the Atlantic tuna fishery, causing competition in an area which has been monopolized by Japan.
- (4) Japanese tuna fishing interests are concerned about their declining catch rates and would prefer that other countries not expand their tuna fisheries.

(5) The proposed Japanese fishery aid funds (US\$90 million) for Korea under the pending normalization agreement between the two countries could increase competition rather than cooperation between Japanese and Korean fisheries.

The article concluded by calling on the Japanese Government to consider the competitive position of the Japanese tuna industry in any adjustment measures that might be proposed.

TUNA VESSELS IMPORTED FROM JAPAN:

Since 1962 Japan has exported to South Korea a total of 42 tuna long-line vessels, consisting of 24 145-ton, 8 175-ton, and 10 215-ton vessels. Of those, 14 145-ton vessels were delivered as complete vessels and the remaining 28 exported in knockdown form for assembly in Korea. Of the 42 vessels, 27 were exported to South Korea in 1965. Included were 11 145-ton refrigerated carrier vessels which were later converted into tuna long-liners at the Japanese port of Shimono-seki. Those vessels were reported operating in the South Pacific out of Espiritu Santo, New Hebrides. The 16 other vessels, consisting of six 175-ton and ten 215-ton vessels, were exported in knockdown form. The six 175-ton vessels were expected to be based at American Samoa. (Suisancho Nippo, November 4, 1965.)



Mexico

SHRIMP FISHERY TRENDS,
JANUARY-SEPTEMBER 1965:

The Mexican West Coast shrimp industry ended the 1964/65 season in mid-July 1965 with the lowest catch in many years. Excellent fishing in the Gulf of Mexico did not offset the decline on the Pacific, and exports to the United States dropped sharply. United States imports of shrimp from Mexico totaled 35.2 million pounds in January-September 1965 as compared with 42.9 million pounds in the same period of 1964.

The outlook for the 1965/66 Mexican shrimp season is uncertain. The West Coast lagoons opened to shrimp fishing on September 1, 1965. For that minor segment of the fishery the ini-

Mexico (Contd.):

tial catches were better than in the previous year.



Fig. 1 - Part of Mexican shrimp fleet at the dock in Mazatlan.

Ocean fishing commenced on September 15, 1965, with indifferent catches through the end of the month. Contract negotiations between vessel owners and fishermen's cooperatives kept most vessels in port during September. Agreement was reached only as a result of Presidential intervention. The cooperatives now receive 54 percent of the proceeds instead of 45, but pay a larger share of the operating expenses.

With the agreement signed, the West Coast fleet was ready to put to sea September 30,



Fig. 2 - Unloading heads-on shrimp from tender-skiffs at Mazatlan. Shrimp trawlers in right background; general-purpose fishing vessel from Manzanillo in left background.

1965, although many vessels were still repairing damage from the hurricane which struck Mazatlan. The storm sank over 20 vessels. (United States Embassy, Mexico, D.F., October 23, 1965.)

Note: See Commercial Fisheries Review, December 1965 p. 73.



Mozambique

SHRIMP FISHERY OFF COAST SHOWS PROMISE:

Commercial fishing operations have been started on a modest scale to exploit the rich shrimp grounds off the Mozambique coast. Those grounds have been carefully studied and tested by French fishery consultants for several months and the results show that they have an impressive potential.

This new fishing enterprise is being initiated by a Portuguese-South African backed company. A substantial part of the shrimp catch will be exported to restaurants and hotels in South Africa, the United States, and on the Continent of Europe. The company also hopes to become a major supplier of fishery products to Mozambique, including a wide range of canned and frozen fish and shellfish.

Two of the four specially equipped trawlers which have been chartered by the firm started fishing off the coast at the beginning of July 1965. The other two vessels were to join them by the end of August.

Research and test trawling has shown that the shrimpbeds are extremely rich and average catch rates were reported comparable with those in the Gulf of Mexico. Catches off the Mozambique coast were reported consistent over the whole area trawled, and test fishing results have suggested that the shrimp trawling season could extend for 9 months of every year. (The South African Shipping News and Fishing Industry Review, September 1965.)

Note: See Commercial Fisheries Review, June 1965 p. 65.



Pakistan

STATUS OF FROZEN FOODS INDUSTRY UNDER SECOND FIVE YEAR PLAN:

Under Pakistan's Second Five Year Plan (1960-65), an expenditure of 10.6 million rupees

Pakistan (Contd.):

(US\$2.2 million) was proposed for the construction of processing and freezer plants and canneries for shrimp and other fishery products. That sum was later increased to 20.5 million rupees (\$4.3 million).

Some 20 shrimp freezing and processing plants are either operating or in the planning stage for the entire country, most of them located in or around Karachi. Since each plant has a daily freezing capacity averaging 10 long tons (2,240 pounds) when operating 6 days a week, the combined annual capacity has a potential of about 50,000 tons.

Pakistan exports frozen shrimp and other fishery products mostly to the United States, India, and the United Kingdom. In fiscal year 1963/64 Pakistan exported about \$15 million worth of frozen fishery products (including shrimp) and canned foods.

Pakistan's import controls are based on the Imports and Exports (Control) Act of 1950 which empowered the Government of Pakistan to "prohibit, restrict, or otherwise control the import or export of goods of any specified description." Commercial imports into Pakistan are subject to import licensing regulations, with the import policy announced semiannually, and the size and composition of imports governed by the country's balance of payments position. Except for single country licenses issued under bilateral trade agreements, or barter or loan arrangements, import licenses are valid for all countries.

There are five can and carton manufacturing firms in Pakistan that produce containers of acceptable quality. However, most canneries and processors of shrimp and other fishery products for export prefer to import their container and packaging supplies because of superior finish, and their foreign sales representatives generally arrange to supply them with printed labels and other packaging materials.

With continued industrialization and development a prime goal of Pakistan's Third Five Year Plan, there is a large and steadily growing market for canning machinery and packaging materials. Pakistani industrialists welcome investment capital and joint ventures with United States firms interested in setting up manufacturing facilities in a

country in which both investment climate and inducements appear to be favorable.

Note: See Commercial Fisheries Review, October 1965 p. 91.

**Peru****FISH MEAL PRODUCTION AND EXPORT FORECAST FOR 1965:**

Peruvian fish meal stocks at the start of 1965 were estimated at 270,000 metric tons. In 1965, Peruvian fish meal production is forecast at 1.1 million tons and exports at 1.3 million tons. (United States Embassy, Lima, November 16, 1965.)

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FISH MEAL INDUSTRY--SHORT- AND LONG-TERM OUTLOOK:

Summary: Peruvian fish-meal production was expected to drop sharply in the last quarter of 1965 due to a relatively poor anchoveta spawning season in 1964. The projected decline seems to indicate the need for a conservation program which will probably take the form of a closed fishing season that might vary in length from year to year, depending on spawning results. With stocks being fully exploited, the Peruvian fish-meal industry will no longer be the growth industry that it has been. For the industry, still burdened with excess capacity, the expected drop in output in 1965 and the dimmed longer term prospects for growth point to a continuing process of consolidation and concentration.

Despite high prices for fish meal, there will be some difficult problems ahead. Even at the record output levels of 1964, Peruvian fish-meal plants overall worked at only an estimated 65 percent of capacity. With fixed costs very high, any significant drop in plant use drives unit costs up sharply. Thus it seems that the prospect is for continued plant closings, some decline in employment, and a continuing trend toward more concentration of ownership within the industry.

Production Prospects: Scientists at the Peruvian Instituto del Mar base their catch forecasts on the following reasoning: The life cycle of the anchoveta is about 18 months. Under current conditions of heavy fishing, the quantity of fish landed is a function of the "spawning recruitment." About 4 months are

Peru (Contd):

required for anchoveta spawn to reach commercial size. The extraordinarily large catch of 1964, when meal output rose 38 percent, was attributed to a heavy spawning recruitment in 1963. But the 1963 year-class was fished out when the normal seasonal slump arrived in June 1965. So the anchoveta catch in late 1965 depended on the 1964 year-class, which was about 50 percent below the record 1963 level. Fourth quarter catches in 1965 were therefore expected to be only half of those in the same period of 1964. In January 1966, anchoveta from the 1965 class will bolster the available supply, but to what extent is not yet known.

In the Peruvian fish meal industry, the end of an era may have been reached. From 1965 through 1964, Peruvian fish meal production expanded at a compound annual rate of more than 50 percent. Peruvian fish meal production is now expected to level off with annual production volume probably varying from around 1963's 1.1 million tons to 1965's (forecast) 1.5 million tons. (United States Embassy, Lima, September 22, 1965.)



Poland

NORTHWEST ATLANTIC FISHERY TRENDS, JULY-AUGUST 1965:

The largest concentration of Polish vessels on Georges Bank during the summer of 1965 appeared in September when 5 Polish stern trawlers and 1 side trawler were seen fishing on Cultivator Shoals. Earlier in the summer, 11 Polish stern trawlers were operating off Labrador. The buildup of the Polish fleet on Georges Bank may indicate a trend toward an increased Polish fishing effort in waters off the United States coasts. Poland's largest fishery research vessel, the 800-ton Wieczno, completed a 35-day survey off Labrador in May 1965 and was scheduled to conduct a similar survey on Georges Bank.

Following are excerpts from the Polish Maritime News, September 1965, describing Polish North Atlantic fishery activities in July-August 1965:

In early August 1965, the Polish research vessel Wieczno left Gdynia for an exploratory

trip to fishing grounds in the northwest Atlantic. A team of Polish scientists planned to test new types of trawls. (Editor's Note: The Wieczno's exact area of operations during the August cruise is not known.)

The Polish freezer trawler Finwal left on her maiden voyage for the Atlantic grounds of Georges Bank. The vessel is the second Polish "B-18-type" trawler of 1,300 dead-weight tons dispatched to the area. Poland's Odra Deep-Sea Fishing Enterprise intends to start systematic fishing on Georges Bank with large freezer-trawlers.

Polish factory trawlers operating on the northwest Atlantic grounds had daily catches of only about 15 to 20 metric tons during July and the first half of August 1965.

On her maiden voyage to the northwest Atlantic, the Polish freezer-trawler Andromeda (B-15 or Leskov class) caught a total of 2,235 tons of ocean perch, cod, and flatfish.

Polish advisers are employed on two Rumanian factory trawlers built in Japan. On each of the vessels the following 5 Polish specialists are employed for a period of 6 months: captain, fishing officer, processing-machines engineer, and 2 fishermen. The Rumanian factory trawlers are operating on the Atlantic grounds.

Note: See Commercial Fisheries Review, Nov. 1965 p. 32; Oct. 1965 p. 41 and 94; May 1965 p. 85.

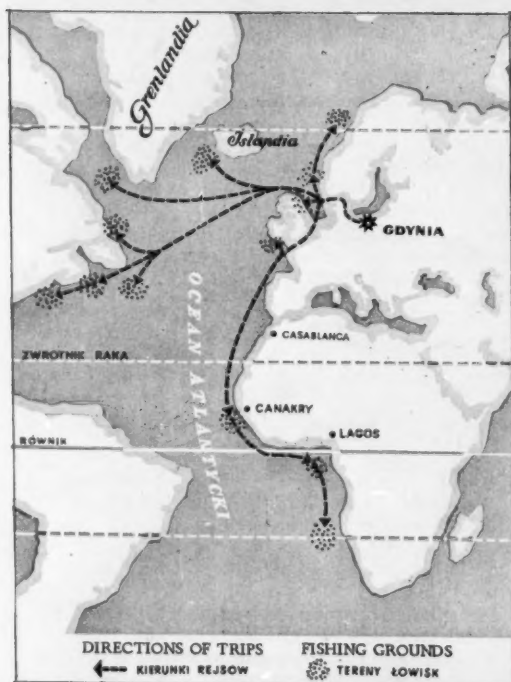
LANDINGS AND FISHERY TRENDS, JANUARY-JUNE 1965:

In the first half of 1965, the Polish fishing fleet gained 1 new factory trawler, 3 freezer trawlers, and several cutters. Polish landings of salt-water fish in January-June 1965 amounted to almost 127,000 metric tons, a gain of about 14,000 tons over the same period of 1964. The increase was due mainly to heavier landings of flatfish, ocean perch, North Sea herring, and unclassified fish from African fishing grounds. Landings were down somewhat for mackerel and sprat. During the first half of 1965, Polish vessels supplied the their home market with 63,000 tons of fish and fishery products--a gain of 1 percent over the same period of 1964.

A new fishery cold-storage and processing plant as well as a repair yard for cutter vessels are being built at the Polish harbor of

Poland (Contd.):

Polish Landings of Salt-Water Fish, January-June 1965 ^{1/} with Comparisons						
Species	State-Owned Enterprises	Cooperatives	Private Fishermen	Total First Half 1965	Total First Half 1964	Total Year 1964
(Metric Tons)						
Salmon	0.5	59.9	32.6	93.0	129.5	355.9
Eel	0.1	13.0	62.2	75.3	68.0	153.7
Baltic herring	3,954.4	1,783.3	297.2	6,034.9	6,201.8	18,844.2
North Sea herring	25,784.4	-	-	25,784.4	21,273.6	94,371.8
Sprat	12,029.7	2,188.5	729.0	14,947.2	15,520.9	17,693.4
Cod	28,951.3	5,916.8	4,033.8	38,901.9	39,618.4	53,563.5
Flatfish	5,761.0	216.4	355.3	6,332.7	2,406.7	6,472.0
Maiflerel	4,559.0	-	-	4,559.0	6,696.4	10,653.9
Ocean perch	14,483.6	-	-	14,483.6	11,388.2	21,414.6
Other salt-water fish ^{2/}	14,641.4	36.1	96.5	14,774.0	8,305.3	18,116.3
Brackish-water fish	-	826.9	168.5	995.4	1,099.6	2,745.5
Total	110,165.4	11,040.9	5,775.1	126,981.4	112,708.4	244,384.8

^{1/}Preliminary.^{2/}Includes catch off Africa.

Routes of Polish fishing trawlers to fishing grounds.

Ustka at a cost of about 100 million zloty (US\$4.17 million).

Polish vessels of Gryf cooperative of Szczecin planned to land about 500 tons of herring in the summer of 1965 at the Norwegian port of Hangesund, for Norwegian

buyers. (Polish Maritime News, No. 85, September 1965.)

Notes: (1) Polish zloty 24.0 equal US\$1.00.

(2) See *Commercial Fisheries Review*, June 1965 p. 74, and Dec. 1964 p. 110.

FISHING VESSELS MAY BE ORDERED FROM DENMARK AND EAST GERMANY:

Factory stern trawlers may be built in Denmark for Poland's fishing fleet. Negotiations to that end were being conducted in the fall of 1965 under the new Danish-Polish trade agreement. The discussions were concerned with the construction of 6 to 10 "B-22-type" factory stern trawlers--an improved version of the "B-15." (The latter has an overall length of about 279 feet, breadth 45 feet, draft 18 feet, gross tonnage 2,670, speed 12.5 knots, cruising range 70 days, and a crew of 110.)

Reports indicated that a final decision on the construction of the Polish trawlers might be made in January 1966. The contract might call for 10 B-22's or, as an alternative, 6 B-22's and 2 or 3 refrigerator transport vessels, the total cost being the same in each instance.

Specific data on the B-22 design are not available, but it has been suggested that they might carry four lines of filleting machines--to handle cod, haddock, pollock, ocean perch, and flatfish--and contact plate freezers with a capacity of 20 tons in 24 hours as well as blast freezers with a capacity of 10 tons in 24 hours. It is possible that Poland may wish to build their first vessels with contact freezers in a foreign yard where such equipment as plate freezers might be easier to obtain.

Poland (Contd.):

Blast freezers on current Polish factory trawlers are unable to produce satisfactory the precisely dimensioned fish blocks needed to meet the terms of a contract a large Polish State fishing enterprise has with a United States firm. The main reason, however, for the proposal to build Polish vessels in Denmark is said to be the Danish-Polish trade agreement which requires that Poland buy Danish products in return for the coal and other products it sells to Denmark.

at Porto Novo, Madeira, with a warehousing capacity of 250-750 tons, and studies were under way for the construction of a similar plant at Vila Real de Santo Antonio in Portugal. In the Azores, the low prices for tuna have not yet given the industry the necessary incentive to carry out a plan of this nature. There are, however, plans for the construction of a refrigerated plant at Horta in the Azores which will be built by a company recently formed. The new company will also build two tuna vessels with refrigerated holds.

Table 1 - Portuguese Landings of Tuna and Similar Species by Areas, 1961-64

Areas	1964			1963			1962			1961		
	Quantity	Value		Quantity	Value		Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Es.	US\$ 1,000	Metric Tons	1,000 Es.	US\$ 1,000	Metric Tons	1,000 Es.	US\$ 1,000	Metric Tons	1,000 Es.	US\$ 1,000
Algarve	521	4,916	1,699	640	5,929	2,049	805	7,442	2,572	1,541	12,211	4,219
Madeira	3,438	12,818	4,429	2,847	11,246	3,886	2,799	11,125	3,844	1,123	5,904	2,040
Azores	1/4,472	11,587	4,004	9,226	23,867	8,247	6,138	14,317	4,947	5,196	11,829	4,087
Total	2/8,431	29,321	10,132	2/12,713	41,042	14,182	2/9,742	32,884	11,363	2/7,660	29,944	10,346

1/Data are for 11 months.

2/Does not include tuna caught by two vessels for which data are unavailable.

Note: 1,000 escudos equals about US\$35.00.

It has also been mentioned that Poland might order five fishing vessels similar to the B-22's from East Germany in exchange for the equivalent in trading, or transport vessels to be built in Poland. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, November 17, 1965.)



Portugal

TUNA FISHERY TRENDS, 1961-64:

Although Portugal is in an excellent geographic location for fishing tuna in waters around the Madeira Islands, Azores, Cape Verde, and in the South Atlantic off the Angola coast, landings of that species represent only a small fraction of Portugal's total commercial fishery landings. The reason is because tuna fishing and facilities have not been modernized.

With the establishment of the Tuna Fishing Guild in November 1960, efforts have been made to change this situation by interesting fishery operators in organizing companies for carrying out plans for the construction of an oceangoing fleet and shore refrigerated plants. Construction of a refrigerated plant was completed this past year

Work on the construction of two other steel-hulled tuna vessels, with a cargo capacity of about 150 tons, was expected to begin shortly. Their home ports will be in the Province of Algarve in the southern part of Portugal and in Madeira.

According to preliminary data from the Tuna Fishing Guild, landings by registered operators in 1964 (5 fixed traps in the Algarve, 48 vessels in Madeira, and 72 vessels in the Azores) of tuna and tuna-like species dropped 34 percent from the previous year's landings, and the value was down 29 percent.

Table 2 - Metropolitan Portugal's Use of Tuna Landings, 1963-64

By Areas	1964	1963
... (Metric Tons) ...		
For Canning:		
Algarve	461	507
Madeira	1,834	1,444
Azores	4,471	9,226
Total for canning	6,766	11,177
Local Consumption:		
Algarve	61	133
Madeira	1,604	1,403
Total for local consumption	1,665	1,536
Total landings	8,431	12,713

Data show that the five traps in the Algarve continued to yield smaller and smaller catches from year to year, and that the 1964 land-

Portugal (Contd.):

ings in Madeira increased 20.7 percent from the previous year. A sharp drop of 52 percent in landings at the Azores is largely attributed to bad weather which kept many of the vessels from leaving port. (United States Embassy, Lisbon, May 29, 1965.)



South Africa Republic

**PELAGIC SHOAL FISH CATCH,
JANUARY-JULY 1965:**

South Africa Republic: The Cape west coast shoal fish catch for the 7-months season through July 1965 was 222,920 short tons pilchards, 44,753 tons maasbanker, 43,967 tons mackerel, and 129,457 tons anchovy. The total catch was 441,097 tons. In the same period of 1964 the total catch was 387,353 tons, made up of 282,301 tons pilchards, 22,121 tons maasbanker, 57,222 tons mackerel, and 25,709 tons anchovy.

The January-July 1965 Cape shoal catch yielded 102,117 short tons of fish meal, 4,276,194 gallons of fish body oil, 1,453 short tons of canned pilchards, 4,761 short tons of canned maasbanker, and 4,933 short tons of canned mackerel.

South-West Africa: In the Territory of South-West Africa, the shoal catch in January-June 1965 totaled 516,163 short tons and consisted of 515,879 tons pilchards and 284 tons anchovy. (South African Shipping News and Fishing Industry Review, August and September 1965.)



U.S.S.R.

**SHRIMP FISHING ACTIVITY IN
GULF OF ALASKA INCREASED:**

A Soviet shrimp fishing fleet has been sent to the Gulf of Alaska for the first time by a Vladivostok marine products trading company controlled by the Soviet Far Eastern Main Fisheries Administration. At the end of October 1965, that fleet (made up of 7 medium freezer trawlers and some support vessels) started operations east of the Shumagin Islands, with additional vessels scheduled to join them later. Most of the shrimp caught

were to be exported, mainly to Japan. Up to that time, commercial shrimp fishing in the eastern Bering Sea supervised by that Soviet Administration was mostly intermittent.

Extensive scientific research by the Soviets had shown abundant resources of shrimp throughout the eastern Bering Sea and North-east Pacific but they lacked proper fishing vessels to start that fishery. In 1962-63 the Soviets began mass production of a new type of medium trawler with freezing capacity (the so-called Maiak or SRTM class of trawler), and decided to enter the shrimp fishery on a worldwide basis.

The first SRTM's were added to the Soviet Pacific fishing fleet in late 1963. By spring 1964, two vessels of that type began shrimp fishing operations north of the Pribilof Islands in an area normally fished by the Japanese. The Pribilof operations, however, were soon discontinued and in late October 1964 the Soviets began a limited shrimp fishery near the Two Headed Island southwest of Kodiak Island in an area also fished by the Japanese. That was the first known Soviet commercial shrimp fishery in the Gulf of Alaska.

In 1965, the Soviets continued their sporadic shrimp fishing operations in the Gulf of Alaska from February until August. The two principal fishing areas were off Kodiak Island (until early May) and east of the Shumagin Islands. It was not until October 1965 that commercial operations on a larger scale were begun.

The Maiak class side trawlers were originally built to chill and freeze herring and bottomfish. But with the constantly decreasing demand for herring, many of them were assigned to shrimp fishing. With a crew of about 30, those 167-foot long vessels with a gross tonnage of 700 tons can freeze up to 6 metric tons a day. Frozen products are kept at 0° F.

The Soviets are also reported to be fishing for shrimp in the Atlantic Ocean off the African coast, in the Indian Ocean (Gulf of Aden and Persian Gulf), and in the South Atlantic and Antarctic Oceans.

U. S. S. R. (Contd.):

DEEP-WATER TRAWLING IN BARENTS SEA:

In 1964, the fishing vessels of the Soviet Northern Fisheries Administration (with headquarters at Murmansk) began to fish in the Barents Sea for halibut at depths of from 700-900 meters (2,300-2,950 feet). From February to mid-June 1965, Soviet catches taken by deep-water trawling in the Barents Sea amounted to 26,700 metric tons of which halibut catches amounted to 8,000 metric tons. At least 18 large trawlers were involved in that fishery. (Rybnoe Khoziaistvo, No. 8, 1965.)

TRAWLING FLEET OFF SOUTH-WEST AFRICA IN JULY 1965:

About 40 Soviet fishing vessels were reported to be operating about 100 miles north of Walvis Bay in South-West Africa during July 1965. The Soviets have maintained trawling operations off South-West Africa since 1961. (The South African Shipping News and Fishing Industry Review, September 1965.)

OFFSHORE FISHING FLEET STATUS, MAY 1965:

In May 1965, the Soviet Union operated over 80 base and motherships in support of her fishing vessels, according to available reports. More than 70 percent of all large ocean-going Soviet fishing vessels are less than 10 years old. The Soviet trawler fleet alone numbers an estimated 4,000 units employing about 180,000 men. The total number of persons employed in the Soviet fishing industry reportedly exceeds 600,000.

PAIR FISHING INCREASES HERRING CATCHES IN 1964:

In 1964, the Soviet Far East Fisheries Administration introduced pair fishing on a large scale. In the entire Soviet Far East Fisheries Administration, 34 pairs of vessels fished in 1964 and caught about 30,000 metric tons of herring. The Soviets claim pair fishing increases catches and reduces costs. For instance, Kamchatka fishermen caught 50,000 tons of herring in 1964 instead of the planned 33,400 tons. In the Kamchatka fisheries, the cost of catching 100 kilograms (224 pounds) of herring was reported to be 1.01 rubles (US\$1.12) for pair fishing as compared with

3.24 rubles (\$3.60) for drift-net fishing. In the entire Far East Fisheries Administration, savings of about 669,000 rubles (\$742,590) were reported as a result of the introduction of pair fishing in 1964.

The Soviets also introduced pair fishing in the Western Fisheries Administration, which has headquarters at Riga on the Baltic Sea. In 1964, that Administration caught 70,000 metric tons of herring by pair fishing, and the cost decreased from 12 rubles (\$13.32) per 100 kilograms of herring caught with drift nets to 2.5-3 rubles (\$2.78-3.33) per 100 kilograms when herring was caught by pair fishing. (Rybnoe Khoziaistvo, No. 8, 1965.)

Note: 0.9 Soviet ruble equals US\$1.

EXPLORATORY FISHERY EXPEDITION TO EASTERN PACIFIC:

To find new fishing grounds for tuna, mackerel, sardines, and other fish, the Soviets have begun a major expedition known as the "First Joint Oceanographic and Fishery Research Expedition to the Eastern and Tropical Pacific." Two of the six research vessels participating left the Soviet Far East port of Vladivostok in mid-October 1965. They are the Lira and the Vnushitel'nyi. The remaining four vessels, among them the Iskatel and the Kanopus, were to leave before the end of October.

Over 40 fishery scientists and oceanographers belonging to the Soviet Pacific Scientific Research Institute for Fisheries and Oceanography (TINRO) at Vladivostok, or to the Institute of Zoology at Leningrad are participating. The main purpose of the expedition is to find new fishing grounds for the rapidly expanding Soviet fishing fleet.

SOVIET FISHING WITH LIGHTS AND ELECTRICITY TO BE EXPANDED:

In 1960, the Soviet Union caught less than 200,000 metric tons of fish by electric-light and electric-field fishing. Much greater use of those fishing methods is outlined in the Soviet 5-year plan for 1966-1970. According to that plan, by 1970 over 700 Soviet vessels are to be fishing with electrical current and/or electric lights. They are expected to catch almost one million metric tons of fish. The largest expansion with those two methods will

U.S.S.R. (Contd.):



Pump fishing with light attraction for sprat (kilka) in the Caspian Sea off Baku aboard a Soviet vessel. The man on the left stands on the drive-shaft housing between the electric driving motor (left) and the fish pump (near his right foot). The suction hose can be seen passing under the fish box and over the railing on the right. The man is holding on to the water/fish separator; the fish trickle down the chute into a hopper (center) while the water flows back into the sea.

come in the Pacific saury fishery and the Atlantic tropical sardine fishery. Electric-light fishing for Black Sea kilka (sprat) is already heavily exploited. (*Rybnoe Khoziaistvo*, No. 8, 1965.)



United Arab Republic

FISHERY TRENDS, 1965:

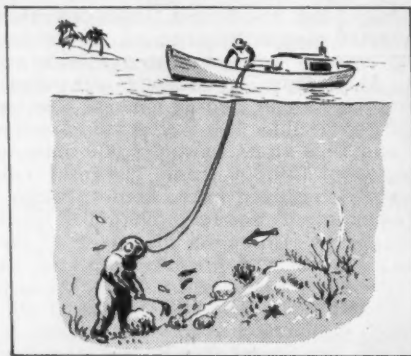
Summary: Major developments in the fishing industry of the United Arab Republic (U.A.R.) in 1965 included the signing of the U.A.R.-U.S.S.R. fishing agreement on June 1, 1965; the opening of the Anfoushy Secondary School for Aquatic Resources in Alexandria; the planning of an institute of marine sciences at university level; and the Egyptianization of sponge fishing off the country's Mediterranean coast.

Anfoushy Secondary School for Aquatic Resources: The Anfoushy Secondary School for Aquatic Resources opened in Alexandria on September 18, 1965, with a student body of 150. Preparatory work for the school had been done by a fisheries advisor loaned to the Egyptian General Organization for Aquatic Resources (GOFAR) by the U. S. Ford Foundation. Plans for the school envision a 3-year course including studies in general science, mathematics, languages, and social

sciences as well as technical subjects relating to the fishing industry such as navigation, mechanics, marine biology, and meteorology. The Ford Foundation has provided a grant of US\$90,000 for the school.

Institute of Marine Sciences and Fisheries: According to press reports, the U.A.R. Ministry of Scientific Research has prepared a plan for a new Institute of Marine Sciences and Fisheries. Further planning for the Institute is being done by the University of Alexandria and the GOFAR, working with a scientist from Iowa State University assigned to the project by the Ford Foundation.

Sponge Fishing: In past years the U.A.R. Government gave Greek fishermen exclusive rights to fish the Egyptian coast of the Mediterranean for sponges. The Greeks were allowed to keep 80 percent of the catch, turning over the balance to the Egyptians. In 1965, the Egyptians took over all sponge fishing in their coastal waters, and the concession for the area between Alexandria and the Libyan border was given to an Alexandria firm which is affiliated with GOFAR. That company owns and operates 9 sponge fishing vessels, 4 supply ships and 1 survey launch. They are manned entirely by Egyptians, each vessel having a crew of 10 or 11 men.



Sponge fishing.

The company has divided its concession area into 4 parts, fishing only 2 sections each year in order to allow sponges to mature. A new sponge bed has been discovered east of Sidi Abd el Rahman, where the most valuable of the three types of Egyptian sponges, the "Turkey cup," is found. For that type of sponge, Japanese buyers are prepared to pay \$90 a kilo. For the "Zimoga" sponge, the Japanese offer \$76 a kilo.

United Arab Republic (Contd.):

The Egyptian sponge season lasts from May until October. By mid-September 1965, according to an official source, the Egyptian sponge catch amounted to 3.5 tons and it was hoped that another 1.5 tons would be added before the end of the season.

Although the sponge has been replaced by the synthetic article, Egyptian sponges are still highly prized for polishing china and tanning leather.



Lake Fisheries: There has been a lengthy dispute between the proponents of drying up the Egyptian coastal lakes and reclaiming the land for agriculture on the one hand, and on the other those who argue that the lakes should be kept for fishing and stocked. It now appears that the argument, at least as far as Lake Mariut is concerned, has been resolved in favor of the fishermen since it has been proved conclusively that the value of fish caught in the lake far exceeds what could be earned by reclaiming and farming the land.

In 1962, the catch in Lake Manzala near Port Said was estimated at 170 metric tons and that in Lake Idku at 17 tons. It was estimated that the 1965 catch in Lake Burullus (east of Rosetta) would reach 1,000 tons of fish, and that the Lake Burullus catch could be increased to 2,000 tons.

Experts in the Hydrobiological Institute in Alexandria have been studying ways of ac-

climatizing marine fish to life in Lake Qarun, since fresh-water fish in Lake Qarun are now almost extinct due to the increasing salinity of the water. An officer of the Institute stated that the salinity of the lake has now reached 28 parts per thousand as opposed to 38 per thousand in the Mediterranean. He reported that mullet and sole fry have been introduced in Lake Qarun with excellent results.

The Institute has also prepared a study on the "Lake Nasser Fisheries Development Plan." Lake Nasser will be created by the Aswan High Dam.

In order to increase the fish population in existing lakes, the Hydrobiological Institute has established a fish farm on Lake Mariut, and £E 35,000 (US\$80,500) was devoted to that project in 1965. Of a total of 1,000 feddans (1,038 acres) in the fish farm, 300 feddans (311 acres) have been set aside for fry.

On November 5, 1964, the *Progres Egyptien* reported that large blue crabs originating in the Indian Ocean have now migrated north up the Red Sea, into the Mediterranean, and thence into the Egyptian coastal lakes where they have multiplied and become a serious threat to the fish of the lakes. The Hydrobiological Institute has now embarked on a dual program to teach fishermen how to catch those crabs on the one hand and to teach the Egyptian public how to cook them on the other.

Coastal Fisheries Development: In a ceremony in Alexandria on September 4, 1965, the Governor of Alexandria turned over to representatives of the city's Fishermen's Cooperative Society 10 motorized fishing boats. The press reported that 60 such boats had been distributed to fishermen's cooperatives in Koseir, Hurghada, and Tor in line with a Government effort to convert the Egyptian fishing fleet from sail to motor.

In the planning stage are the construction of a fishing port at Damietta, fishing projects in the Red Sea and Rosetta, and a plant for the extraction of oil from fish of the Red Sea.

Marketing: In mid-July 1965, the press reported complaints about the reduced quantity of fresh fish offered in the Alexandria market. *Le Progres Egyptien* announced on July 14 that the supply had fallen 36 percent in the first 4 months of 1965 from that in the same period of 1964. Perhaps because of that shortage as well as because of reported increases in the price of fish, the Govern-

United Arab Republic (Contd.):

ment announced in September 1965 that fish would henceforth be marketed through Government-controlled cooperatives. Prices were uncontrolled during the month of October, but ceilings were placed on them in November to be revised every 2 weeks. (United States Consulate, Alexandria, November 10, 1965.)

FOREIGN TRADE IN
FISHERY PRODUCTS, 1964:

Imports: In 1964, imports of fishery products by the United Arab Republic (UAR) totaled 6,201 metric tons valued at £E604,458 (US\$1,390,253). Canned and preserved fishery products accounted for 57 percent of the quantity and 98 percent of the value of the 1964 fishery imports. Included in that category were 756 tons of canned tuna, 607 tons of cured herring, 212 tons of other cured fish, and almost 2,000 tons of other canned or preserved fishery products.

Exports: Fishery exports by the UAR in 1964 totaled 2,210 tons valued at £E805,823 (\$1,853,393). The 1964 shipments of fresh and frozen shrimp, the main fishery export item, totaled 1,355 tons valued at £E613,651 (\$1,411,397). The exports also included 111 tons of salted or dried shrimp, 572 tons of fresh or frozen fish, and 118 tons of cured fish. (United States Consulate, Alexandria, November 10, 1965.)



United Kingdom

SALES COMPANIES IN UNITED STATES
FORMED BY BRITISH FOOD FIRM:

The overseas marketing organization of a large British food firm is to form two fishery sales companies in the United States. The two new companies will be mainly concerned with the marketing of frozen spiny lobster tails and shrimp from the parent company's fishery operations in Australia and the Middle East.

The two companies in the United States will have their headquarters in New York City and Los Angeles, Calif. The New York unit, being formed in association with a U.S. firm, will handle all United States East Coast

and Midwest sales. The unit in Los Angeles, also in association with a U. S. firm, will be responsible for West Coast sales.

The managing director of the British food firm's International Division says that 1966 sales are estimated at over \$5 million. In 1967, sales are expected to increase substantially as expansion programs in Australia and the Middle East get under way. Also, frozen fishery products of the British firm's subsidiary in St. Johns, Newfoundland, will be available for marketing in the United States in 1967.

FIRM CONTRACTS FOR SOVIET
CANNED SALMON AND CRAB MEAT:

A £1,250,000 (US\$3.5 million) contract was signed in fall 1965 between the Soviet Union and a British firm for canned salmon and crab meat to be imported by Great Britain during the following six months. The agreement is the third to be negotiated between the British food company and the Soviets. The British firm is the sole distributor of Soviet fishery products in the United Kingdom and has the option of future supplies as agreed in previous contracts. (*Fishing News*, October 15, 1965.)

FISHERY LOAN INTEREST
RATES REVISED:

The British White Fish Authority rates of interest on loans made after October 2, 1965, are:

Fishing vessels of not more than 140 feet, new engines, nets, and gear: on loans for not more than 5 years, $7\frac{1}{4}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 5 years but not more than 10 years, $7\frac{1}{8}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 10 years but not more than 15 years, $7\frac{1}{8}$ percent (no change); on loans for more than 15 years but not more than 20 years, $7\frac{1}{8}$ percent (decrease $\frac{1}{8}$ percent).

The rate to processing plants for loans of not more than 20 years is unchanged at $7\frac{1}{4}$ percent.

The rates on loans made before October 2, 1965, are unchanged. (*Fish Trades Gazette*, October 16, 1965.)

Note: See *Commercial Fisheries Review*, Dec. 1965 p. 82.

United Kingdom (Contd.):

NEW TRAWLERS FROM OLD HULLS:

Four middle-water trawlers are being lengthened and converted from steam to diesel power for distant-water fishing by a large British fishing company. In the fall of 1965, the Ross Kelly was cut in half in a Grimsby shipyard to enable a 23.5-foot prefabricated section to be inserted. The new section will lengthen the vessel to 163 feet. The other



Shows middle-water trawler Ross Kelly cut in half on a Grimsby slipway. The vessel is being lengthened for distant-water fishing.

trawlers to be converted in the 2-year program are Ross Kipling, Ross Kashmir, and Ross Kelvin, all built in 1956-58 for fishing off the Faroe Islands. Cost of the conversion program is £600,000 (US\$1.68 million).

Since 2 other trawlers were similarly lengthened in 1963, their earnings have increased by 50 percent.



Yugoslavia

NEW TUNA VESSELS OUTFITTED FOR ATLANTIC FISHING:

In the fall of 1965, it was announced at a Yugoslav conference in Izola that three new Yugoslav tuna vessels would be outfitted as soon as possible for their maiden voyage to the Atlantic (probably off the West Coast of Africa). Previous reports indicate that those vessels are 145-foot purse seiners with a carrying capacity of 475 metric tons of tuna. They were built at Pula for a Yugoslav fishing company, also of Pula.

In 1963, Yugoslavia imported over 12,000 tons of Japanese frozen tuna, most of which was canned for re-export, according to Japanese reports.

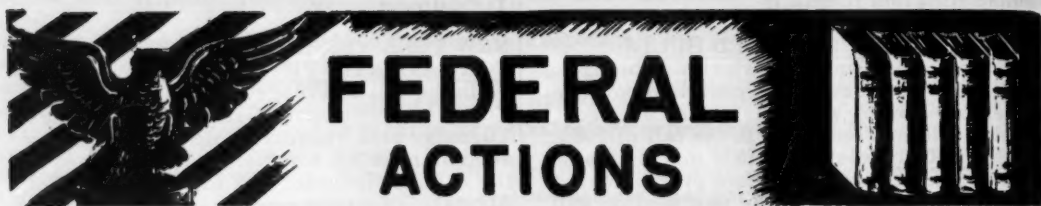
In the past, Yugoslavia has been limited mainly to Adriatic fishing, and the country's annual catch has been only 20,000 to 25,000 tons of fish. A proposed 1964-1970 Development Plan calls for Yugoslavia to add 40 ocean fishing vessels to its fleet and to increase its annual catch to 120,000 metric tons by 1970.

Note: See Commercial Fisheries Review, Jan. 1965 p. 96; Sept. 1964 p. 115; Mar. 1964 p. 56.



JAPAN'S CULTURED PEARL INDUSTRY

Production of cultured pearls in Japan has risen to US\$55.5 million a year. About 90 percent of the pearls are exported, and in 1963 exports totaled \$46.6 million, double those in 1959. The United States now takes about 40 percent of exports, and Switzerland 20 percent. The remainder go to West Germany, Hong Kong, France, Italy, and India. (Australian Fisheries Newsletter, November 1964.)



Federal Committee on Pest Control

PESTICIDE MONITORING PROGRAM APPROVED:

A comprehensive program to monitor levels of pesticide residues in people, fish and wildlife, food and feed, soil, and water in the United States has been approved by the Federal Committee on Pest Control (FCPC).

The FCPC, an interagency group, reviews all pest control activities conducted by Federal Departments or financed wholly or in part with Federal funds. Members of the FCPC include representatives of the Departments of Agriculture; Health, Education, and Welfare; Interior; and Defense.

The objective of the monitoring program is to determine the extent to which pesticide residue levels exist in the United States and to detect such increases or decreases as may occur in the future. Data developed by the program will be made widely available through the publication of summaries and by other means.

The program incorporates some Federal pesticides monitoring which the Departments have had under way for several years.

The program, developed by the FCPC Subcommittee on Pesticide Monitoring, represents action by Federal Departments to coordinate and expand pesticide monitoring efforts in principal elements of the national environment. During the first year of the program, FCPC members expect to learn if details of the plan are workable and if it should be expanded. Environments being considered for inclusion are air, lakes, and ground water in which technical problems now make pesticide measurements difficult.

Fish: The monitoring of fish by the Department of Interior will attempt to inform

scientists about aquatic environmental conditions in which fish live. This may provide the basis for intensive studies on the meaning of pesticide levels to the physiological processes of fish.

A minimum of three species of fish in various parts of the United States will be studied for the presence of pesticide residues. The species will vary according to location. They should reflect the degree of residues in organisms upon which they have fed. The order of preference in fish to be sampled is: carp, buffalofish, black bass, channel catfish, green sunfish, yellow perch, rainbow trout, and squawfish.

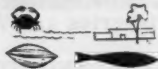
Samples will be taken at 50 sites twice a year, as close to April and October as possible. These times will show the possible effect of the summer use of pesticides.

Major estuaries, where salt and fresh water meet, and major river drainages containing commercial quantities of shellfish will be included in the program. Oysters and clams, which filter large amounts of water to obtain food, will be studied. Samples of such shellfish and sediment will be taken three times a year.

Water: Fifty-five locations, covering all of the major river drainages, will be sampled by the Department of Health, Education, and Welfare or by the Department of the Interior to provide continuing information on pesticide residues in the nation's water supply.

Rivers generally will be sampled at places where they empty into other bodies of water. Some samples will be taken at upstream locations. Samples will be taken monthly and will be analyzed to a sensitivity of one part of pesticide to one trillion parts of water.

Other Studies: The pesticide monitoring program will also include (1) the continued surveillance of pesticide residues in food and feed by the Food and Drug Administration in cooperation with the Department of Agriculture; (2) the sampling of soil by the Department of Agriculture to determine the rate of accumulation of certain pesticides; and (3) studies of pesticide residues in people by the Public Health Service.



General Services Administration

FEDERAL SUPPLY SERVICE

NEW FEDERAL SPECIFICATIONS FOR CANNED SARDINES, CANNED SHRIMP, AND CANNED TUNA:

New Federal Specifications for canned sardines, canned shrimp, and canned tuna have been approved for the use of all Federal Agencies by the Commissioner, Federal Supply Service, General Services Administration. The new specifications were developed by the U. S. Bureau of Commercial Fisheries in cooperation with industry producers and Government buyers.

The new specifications include the following sections: (1) Scope and Classification; (2) Applicable Specifications, Standards, and Other Publications; (3) Requirements; (4) Sampling, Inspection, and Test Procedures; (5) Preparation for Delivery; and (6) Notes.

Federal Specification PP-S-51g, Sardines, Canned, effective September 7, 1965, supersedes Int. Fed. Spec. PP-S-0051f (INT-FWS) of December 5, 1962, and Fed. Spec. PP-S-51d of April 11, 1957.

Federal Specification PP-S-311c, Shrimp, Canned, effective September 3, 1965, supersedes Int. Fed. Spec. PP-S-00311b (INT-FWS) of August 9, 1963, and Fed. Spec. PP-S-311a of September 8, 1955.

Federal Specification PP-T-771b, Tuna, Canned, effective September 20, 1965, supersedes Int. Fed. Spec. PP-T-00771a (INT-FWS) of June 23, 1962, and Fed. Spec. PP-T-771 of March 31, 1931.

Copies of the new specifications may be purchased from the U. S. Government Printing Office: price 5 cents each for those on

canned tuna or canned shrimp; 10 cents each for those on canned sardines.



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Bert Arthur Bender, 7730 Sunnyside Avenue North, Seattle, Wash. 98103; has applied for aid in financing the purchase of a used 30-foot wood gill-net vessel to engage in the fishery for salmon in the Cook Inlet area of Alaska. Notice of the application was published by the U. S. Bureau of Commercial Fisheries in the Federal Register, November 10, 1965.

Julius R. Majdic, Post Office Box 2018, Kodiak, Alaska 99615, has applied for a loan to aid in financing the purchase of a new 32-foot wood combination seine and gill-net vessel to engage in the fishery for salmon in the Kodiak area of Alaska. Notice of the application was published in the Federal Register, November 10, 1965.

James H. and Leola E. Baumgartner, 1337 Montana Street, Coos Bay, Oreg., have applied for a loan to aid in financing the purchase of a used 45.3-foot registered length wood trolling vessel to engage in the fishery for tuna and salmon in the Coos Bay area of Oregon. Notice of their application was published in the Federal Register, November 13, 1965.

Louis E. Wiegand, 3301 South Lake Drive, Miami, Fla., has applied for a loan to aid in financing the construction of a new 44-foot wood vessel to engage in the fishery for lobster, snapper, and grouper in the Florida area. Notice of the application was published in the Federal Register, November 17, 1965.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used ves-

sel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

HEARING ON APPLICATION FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Pacific Trade Winds, Inc., 110 West Ocean Boulevard, Long Beach, Calif., has applied for a fishing vessel construction differential subsidy to aid in the construction of a 150-foot overall steel vessel to engage in the fishery for tuna. A hearing on the economic aspects of this application was held. The U. S. Bureau of Commercial Fisheries published the notice of the application and hearing in the Federal Register, November 17, 1965.



Eighty-Ninth Congress (First Session)



Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

SUPPLEMENTAL APPROPRIATIONS

1966: S. Rept. 912, Supplemental Appropriation Bill, 1966 (Oct. 19, 1965, report from the Committee on Appropriations, U. S. Senate, 89th Congress, 1st session, to accompany H. R. 11588), 72 pp., printed. Committee reported bill favorably with various amendments. The bill under the State Department includes \$500,000 for facilities for the International Pacific Halibut Commission; under the Interior Department, construction funds for Bureau of Sport Fisheries and Wildlife.

TRINITY RIVER AND TRIBUTARIES, TEXAS: H. Doc. 276, Trinity River and Tributaries, Texas

Letter from the Secretary of the Army, transmitting a letter from the Chief of Engineers, Department of the Army, Dated November 29, 1963, Submitting a Report, Together with Accompanying Papers and Illustrations, on a Review of the Reports on and a Survey of the Trinity River and Tributaries, Texas, made Pursuant to Several Congressional Authorizations Listed in the Report; in five volumes, volume V; referred to the Committee on Public Works, House of Representatives, 89th Congress, 1st session, Aug. 25, 1965, 276 pp., illus., printed. Volume V contains information on recreation and fish and wildlife; economic base study; comments of other agencies; and resolutions, public hearings, and prior reports. A small section discusses commercial fishing in the Trinity River area.



PRESIDENTIAL GREETING TO MEETING OF FISHERY ASSOCIATIONS

A highlight of the joint meeting June 20-23, 1965, in Miami Beach, Fla., of the Shrimp Association of the Americas and the Southeastern Fisheries Association was a telegram of greeting from President Lyndon B. Johnson. The telegram read as follows:

I EXTEND TO YOUR ASSOCIATIONS ASSEMBLED IN JOINT MEETING MY BEST WISHES FOR PRODUCTIVE AND SUCCESSFUL DISCUSSIONS. I AM ESPECIALLY PLEASED TO SEE THIS INTIMATE INTERNATIONAL COOPERATION BETWEEN ALL NORTH AND CENTRAL AMERICAN PRODUCERS OF THESE VERY IMPORTANT MARINE RESOURCES. YOUR PRODUCTS CONTRIBUTE SIGNIFICANTLY TO OUR NUTRITIONAL WELL-BEING AND TO WELCOME VARIETY IN OUR DIETS. THIS IS TRULY A SPLENDID EXAMPLE OF JOINT EFFORTS TO UTILIZE AND CONSERVE NATURAL RESOURCES AND REFLECTS THE BEST SPIRIT OF OUR INTERNATIONAL COOPERATION YEAR.

LYNDON B. JOHNSON



RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
MWL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number	Title
CFS-3872	- Virginia Landings, April 1965, 4 pp.
CFS-3888	- California Landings, May 1965, 4 pp.
CFS-3889	- Virginia Landings, May 1965, 4 pp.
CFS-3890	- Maryland Landings, June 1965, 4 pp.
CFS-3899	- Louisiana Landings, 1964 Annual Summary, 7 pp.
CFS-3900	- Frozen Fishery Products, August 1965, 8 pp.
CFS-3901	- Texas Landings, 1964 Annual Summary, 8 pp.
CFS-3902	- Imports of Fish Meal and Scrap, 1937-1964, H. S. No. 1 (Revised), 6 pp.
CFS-3903	- U. S. Fish Meal and Scrap Production, 1929-1964, H. S. No. 2 (Revised), 4 pp.
CFS-3904	- Foreign Trade in Fish and Marine-Animal Oils, 1925-1964, H. S. No. 3 (Revised), 10 pp.
CFS-3905	- Menhaden Fishery, 1873-1964, H. S. No. 4, 7 pp.
CFS-3908	- Fish Meal and Oil, July 1965, 2 pp.
CFS-3909	- California Landings, June 1965, 4 pp.
CFS-3910	- South Atlantic Fisheries, 1964 Annual Summary, 9 pp.
CFS-3911	- Alabama Landings, July 1965, 3 pp.
CFS-3913	- Georgia Landings, June 1965, 2 pp.
CFS-3916	- Michigan, Ohio & Wisconsin Landings, June 1965, 4 pp.
CFS-3917	- Shrimp Landings, March 1965, 5 pp.
CFS-3918	- Gulf Coast Shrimp Data, March 1965, 15 pp.
CFS-3920	- Oregon Landings, 1964 Annual Summary, 2 pp.
CFS-3921	- Washington Landings, 1964 Annual Summary, 2 pp.
CFS-3924	- Mississippi Landings, June 1965, 3 pp.
CFS-3925	- Maine Landings, July 1965, 4 pp.
CFS-3927	- New York Landings, July 1965, 3 pp.
CFS-3928	- Louisiana Landings, July 1965, 3 pp.
CFS-3931	- Florida Landings, August 1965, 8 pp.

Wholesale Dealers in Fishery Products (Revised):

- SL-25 - Wisconsin (Great Lakes Area), 1964, 2 pp.
SL-32 - Minnesota (Mississippi River and Tributaries), 1964, 1 p.
SL-34 - Wisconsin (Mississippi River and Tributaries), 1964, 2 pp.

Sep. No. 746 - A Japanese Gill-Net Fishery for Bottom-fish in the Gulf of Alaska.

Sep. No. 747 - Reduction Process to Convert Raw Fish into Thiaminase-Free Press Cake.

Sep. No. 748 - Technical Note No. 1--Rapid Field Method for Determining the Salt Concentration in Fresh and Smoked Chub.

FL-147 - List of National Fish Hatcheries, 11 pp., revised July 1965.

FL-190 - Turtle Trapping, 8 pp., illus., revised March 1965.

FL-579 - Castnets Constructed of Machine-Made Netting, by Hilton M. Floyd, 14 pp., illus., processed, June 1965.

FL-580 - Sea Lamprey, by Lola T. Dees, 10 pp., illus., Aug. 1965. Discusses the history of the sea lamprey invasion of the Great Lakes following the completion of the Welland Canal between Lakes Erie and Ontario in 1829; effect of lamprey attacks on the Great Lakes fishery; natural history--spawning, larval and adult lampreys; value of lampreys; their control; and restoring the lake trout after decimation by lampreys.

FL-585 - Fisheries Loans for Vessels and Gear, 14 pp., August 1965.

SSR-Fish. No. 505 - Spiny Lobster Explorations in the Pacific and Caribbean Waters of the Republic of Panama, by Johnny A. Butler and Norman L. Pease, 30 pp., illus., July 1965. An interagency agreement, signed in June 1962, between the U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, and the U. S. Agency for International Development resulted in a survey of the spiny lobster potential in Panamanian waters. Bureau staff members used the chartered 72-foot vessel Pelican. This report describes explorations in 1962 carried out in both Caribbean and Pacific waters with wood, reed, and wire traps. Wood traps proved most economical and successful. Bait for the traps (small, mixed

bottomfish) was obtained locally. Indications of commercial potential for a spiny lobster fishery were found. During 1963 work included simulated commercial fishing with traps and trawls. Excellent catches were made. In addition to spiny lobsters, sand lobsters and bay scallops were found in sufficient numbers to start a new Panamanian industry.

SSR-Fish. No. 517 - A Raft for Direct Subsurface Observation at Sea, by Reginald M. Gooding, 7 pp., illus., June 1965.

SSR-Fish. No. 518 - Industrial Bottomfish Fishery of the Northern Gulf of Mexico, 1959-63, by Charles M. Roithmayr, 27 pp., illus., Sept. 1965.

A Review of the Gulf of Mexico Red Snapper Fishery, by James S. Carpenter, Circular 208, 39 pp., illus., printed, Aug. 1965. Discusses the red snapper fishery and its development in the Gulf of Mexico. From a relatively small fleet of sail-powered schooners with live-wells for keeping fish, the vessels have now become a group of diesel powered boats using ice for preserving the catch. The fishing grounds have grown from areas lying close to the mainland (inside 40 fathoms) off Florida and the "middle grounds" southeast of Pensacola to the "western grounds" off Texas and the Campeche Banks off Mexico. Gear has developed from cotton hand lines using the hand-over-hand technique to stainless-steel lines with reels and improved terminal gear. Navigation has metamorphosed from dead-reckoning and sounding techniques to modern electronic equipment, complete and accurate charts, and celestial navigation. Gear has been improved from the generally ineffective cod gill nets, long lines, hoop nets, and fish traps to the highly successful modified otter trawls. Unsatisfactory fish-handling techniques, resulting in poor quality, have evolved into greatly improved methods. Marketing has changed from almost exclusive use of railroads for shipping fish iced in barrels to the predominant use of trucks for shipping boxes of iced fish.

Annual Report of the Bureau of Commercial Fisheries Radiobiological Laboratory, Beaufort, N. C., for the Fiscal Year Ending June 30, 1964, Circular 217, 37 pp., illus., June 1965. Presents details on accomplishments of the Radiobiological Laboratory in programs on estuarine ecology, pollution studies, and radiation effects. Also includes information on staff activities, new laboratory facilities, meetings attended by laboratory personnel, scientific papers presented, and staff publications.

Fishery Product Inspection, Circular 218, 12 pp., illus., printed, April 1965. Discusses the USDI voluntary inspection service; U. S. grade standards; the three types of inspection--continuous inspection, lot inspection, and unofficial sample inspection; how you can get USDI inspection service; and inspection fees.

Fish Go in Schools, by Bob Finley and Ann Davies, Circular No. 222, 16 pp., illus., printed. Discusses how fishery products have kept pace with innovations in convenience, and are excellent for use in school lunches. Variety is offered in the many species of shellfish and finfish on the market; the many market forms and ways in which they can be prepared. Further advantages are found in their economy, excellent nutritive value, and ease of preparation. Tips on baking fish are offered. The many market forms of fish, standards in selecting fresh fish, quality in

frozen fish, and thawing procedures are discussed. A section on how to arouse interest and awaken appetites covers use of imaginative planning, food education and acceptance, romance of science, posting of menus, coordination of nutrition classes with the school-lunch program, and visual communication.

Biological Laboratory, Galveston, Tex., Fishery Research for the Year Ending June 30, 1964, Circular 230, 113 pp., illus., Aug. 1965. Presents details on accomplishments of the Galveston Laboratory in programs on shrimp biology, shrimp dynamics, industrial fishery, estuarine ecology, and experimental biology. Also contains information on special reports on biological indicators in East Lagoon, Galveston Island, distribution of bottom sediments in Clear Lake, Tex., research on the molecular basis of brain function in fish, and description of salt-water laboratories; library and laboratory facilities; meetings attended by laboratory personnel; work conferences attended; publications by staff members; manuscripts in press and submitted.

The Fishery-Oceanography Center, La Jolla, California, edited by Robert I. Clutter and Glenn A. Flittner, Circular 232, 37 pp., illus., Oct. 1965. Describes briefly the facilities of the laboratory and research vessels operated in connection with the La Jolla Fishery-Oceanography Center. Provides information on accomplishments of the California Current Resources Laboratory conducting research on the California sardine--population dynamics, subpopulations, pelagic surveys, life history and taxonomy, physiology, behavior, and plankton dynamics. Discusses work of tuna resources laboratory--forecasting and oceanography, tuna behavior, temperate tuna biology, operations research, and contract research; Scripps tuna oceanography research; Inter-American Tropical Tuna Commission; and California's Marine Research Committee.

Fishery Management Services Annual Report for 1964, Resource Status Report 2, 53 pp., illus., June 1965.

Make Your Seafood Menus Sing--Perk 'Em Up with Pecans, Fisheries Marketing Bulletin, 6 pp., illus., printed. Introduces the use of pecans in fish cookery. Contains recipes for shrimp 'n' cranberry salad, tuna waldorf salad, salmon party log, crab salad in lime mold, and shrimp-cheese dreams.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number	Title
MNL-17	The Italian Fishing Industry, 1964, 15 pp.
MNL-90	Belgian Fishing Industry, 1964, 31 pp.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary, Part I--Fishery Products Production and Market Data, September 1965, 16 pp. (Market News Service, U.S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil and solubles; for the month indicated.

California Fishery Market News Monthly Summary.

Part II—Fishing Information, September 1965, 8 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

California Fishery Products and Byproducts Brokers, Importers, and Exporters, 1964, SP List I (Revised), 11 pp., Oct. 1965. (U. S. Bureau of Commercial Fisheries, Market News Service, Post Office Bldg., San Pedro, Calif. 90731.)

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, September 1965, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the month indicated.

List of Primary Receivers of Imported Fishery Products and Byproducts, New Orleans, La., 1965, 4 pp., Sept. 30, 1965. (U. S. Bureau of Commercial Fisheries, Market News Service, 608 Federal Bldg., 600 South St., New Orleans, La. 70130.)

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September 1965, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, September 1965, 24 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, September 1965, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the hal-

ibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE ICHTHYOLOGICAL LABORATORY, BUREAU OF COMMERCIAL FISHERIES, U. S. NATIONAL MUSEUM, WASHINGTON, D. C. 20560.

The Composition of Species of the Genus CYCLOTHONE (Pisces, Gonostomidae) in the Pacific Ocean, by V. A. Mukhacheva, Translation No. 36, 51 pp., 1965. (Translated from the Russian, *Trudy Instituta Okeanologii, Akad. Nauk SSSR*, vol. 73, 1964, pp. 93-138.)

On the Life Colors of Some Fishes. XIII: Scientific Names of "Gingao-Iwashi," by Nagamichi Kuroda, Translation No. 37, 10 pp., 1965. (Translated from the Japanese, *Japanese Journal of Ichthyology*, vol. 8, nos. 5/6, June 30, 1962, pp. 122-125; *Zoological Magazine*, vol. 70, no. 3, March 15, 1951, pp. 98-101.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

Dolphins and Porpoises, Fisheries Center Leaflet 1, 8 pp., illus., printed, 1965, 5 cents. This is the first of a new series of leaflets to be published by the forthcoming National Fisheries Center and Aquarium. It describes dolphins and porpoises, smaller members of the suborder Odontoceti, or toothed whales. In spite of their strong resemblance to fish, they are warm-blooded, aquatic mammals, bearing their young alive and nursing them on milk as do more easily recognized mammals. Although much alike, dolphins and porpoises are frequently placed in different families by zoologists--chiefly on the basis of the form of the teeth and the presence of small bony protuberances on the forward edge of the dorsal fin. The structure, behavior, and reproduction of the two are described and compared. Short descriptions, accompanied by illustrative drawings, are given for the Atlantic bottlenose dolphin, spotted dolphin, spinner dolphin, common dolphin, Pacific whitesided dolphin, Amazon freshwater dolphin, pink freshwater dolphin, harbor porpoise, Burmeister porpoise, Dall porpoise, and finless black porpoise.

Marine Decapod Crustaceans of the Carolinas, by Austin B. Williams, Fishery Bulletin, vol. 65, no. 1, 1965, 309 pp., illus., printed, \$2.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ANCHOVY:

Considerations on the Sampling of Marine Fish. IV--Sampling of ANCHOVIELLA HUBBSI Hildebrand, by Hitoshi Nomura, Contribution No. 31, 6 pp., printed

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

in English with Portuguese summary. (Reprinted from *Revista Brasileira de Biologia*, vol. 24, no. 4, Dec. 1964, pp. 365-370.) Sociedade de Biologia de Brasil, Caixa Postal 1587, Rio de Janeiro, Brazil.

AQUATIC BIOLOGY:

"Floating classroom for aquatic biology," by H. Charles Laun, article, *Turtlex News*, vol. 43, no. 5, 1965, pp. 130-133, illus., printed. General Biological Supply House, Inc., 8200 S. Hoyne Ave., Chicago, Ill.

ARAL SEA:

"O sokhraneni basseina Aral'skogo morya kak vazhveishego istochnika tsennykh rybnikh produktov" (On the preservation of the Aral Sea basin as a major source of valuable fish products), by L. S. Berdichevskii, article, *Rybnye Zapasy Aral'skogo Morya i Puti ikh Ratsional'nogo Ispol'zovaniya* (Fish Resources of the Aral Sea and Ways of Their Rational Utilization), pp. 132-134, printed in Russian. Nauka, Tashkent, U.S.S.R.

ARGENTINA:

"La produccion Argentina de pescado en 1964" (Argentina's fishery production in 1964), by Carlos Taboas, article, *Industrias Pesqueras* (Statistics Annual for 1964), vol. 39, nos. 913-914, May 15, 1965, p. 208, printed in Spanish. Industrias Pesqueras, Apartado 35, Vigo, Spain.

Produccion Pesquera Argentina, 1964 (Argentina's Fishery Production, 1964), 114 pp., illus., processed in Spanish. Departamento de Investigaciones Pesqueras, Direccion General de Pesca, Secretaria de Estado de Agricultura Ganaderia, Brasil y Florencio Sanchez, Buenos Aires, Argentina. Presents a brief summary of the Fisheries of Argentina in 1964--landings totalling 160,306 metric tons, production of processed products, development of fishery resources, increase of per capita fish consumption, production of 11,852.2 tons of fish meal, increase in number of fishing vessels, principal fishing ports, installation of processing plants, distribution of fishery products by refrigerated trucks, production of fresh-water fisheries, and foreign trade in fishery products. Most of the report is devoted to statistical tables showing quantity and value of fishery landings, 1935-64; quantity and value of processed products, 1964; marine fishery production by species and by months and ports; high-seas fishery production by species and ports; coastal fishery production by ports and by species and months; fresh-water fishery production by areas and months; production of processed fishery products and byproducts; and foreign trade in fishery products.

AUSTRALIA:

Additions to the Fish Fauna of Western Australia, by G. F. Mees, *Fisheries Bulletin* No. 9, pt. 4, printed, 1964. Western Australia Fisheries Department, Perth, Australia.

Guide to Fishes (Queensland), by E. M. Grant, *Fisheries Notes*, vol. 2, no. 2, 1965, 288 pp., illus., printed. Department of Harbours & Marine, Edward St., Box 509H, G.P.O., Brisbane, Australia. This book contains a representative selection of the fish and crustaceans (including those used for bait) most commonly encountered by fishermen along the Queensland coast. The book is an aid to anglers and com-

mercial fishermen in the visual identification of principal species. It provides general information on habits, coloration, catchability. It helps the amateur naturalist in distinguishing between related species and gives a taxonomic description for the scientific worker. Chapters cover the sharks and rays, marine fish (general), fresh-water fish, poisonous fish, and crustaceans. Also included are an index of common names and an index of scientific names, an adequate bibliography, and descriptions of crustaceans. Each page describing a fish bears the best available illustration of the principal fish described, and details the more easily discernible points of dissimilarity from other and related species. Although intended primarily for biology students, the book will interest both commercial and sport fishermen, as well as amateur naturalists.

BACTERIOLOGY:

Der Phenolgehalt des Wassers in Seiner Auswirkung auf den Fischorganismus (The Phenol Content of Water and Its Effect on Fish Organisms), by H. H. Reichenbach-Klinke, 16 pp., illus., printed in German with English summary. (Reprinted from *Archiv fur Fischereiwissenschaft*, vol. 16, no. 1, July 1965, pp. 1-16.) Bundesforschungsanstalt fur Fischerei, Palm-alle 9, Hamburg-Altona 1, Federal Republic of Germany.

BARENTS SEA:

"New data on the northern limit of occurrence of young cod, haddock, Norway haddock, and herring in the Barents Sea," by T. S. Berger, B. A. Popov, and R. A. Cheremisinina, article, *Dokl. Akad. Nauk SSSR Biol. Sci. Sect.*, vol. 143, no. 176, 1962, printed in Russian. Akademiia Nauk SSSR, Podmosenski per. 21, Moscow B-64, U.S.S.R.

BENTHIC FISH:

A Photographic Survey of Benthic Fishes in the Red Sea and Gulf of Aden, with Observations on Their Population Density, Diversity, and Habits, by N. B. Marshall and D. W. Bourne, *Bulletin* vol. 132, no. 2, 244 pp., 1964, illus., printed. Harvard University, Museum of Comparative Zoology, Cambridge, Mass.

BERING SEA:

"Khimicheskaya kharakteristika zheltoperoi kambaly, treski i mintaya yugo-vostochnoi chasti Beringova morya" (Chemical composition of yellowfin sole, cod and walleye pollock of the southeastern Bering Sea), by M. N. Krivobok and O. I. Tarkavskaya, article, *Trudy Vses. Nauch. Issled. Inst. Morsk. Rybn. Khoz. Okeanogr.*, vol. 49, 1964, pp. 257-272, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

BILLFISH:

Distribution and Relative Abundance of Billfishes (Is-tiophoridae) of the Pacific Ocean, by John K. Howard and Shoji Ueyanagi, *Studies in Tropical Oceanography* No. 2, 144 pp., illus., printed, July 1965, \$5.50. Publications Department, Institute of Marine Science, 1 Rickenbacker Causeway, Miami, Fla. 33149.

BIOLOGICAL SPECIMENS:

A Method for Preserving Color in Biological Specimens, by Richard A. Waller and William N. Eschmeyer, 1 p., printed. (Reprinted from *BioScience*, vol. 15, no. 5, 1965, p. 361.) American Institute of Biological Sciences, 2000 P St. NW., Washington, D. C.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

BRAZIL:

Peixes Marinhos (Marine Fish), by Hitoshi Nomura and N. Menezes, 43 pp., printed in Portuguese. (Reprinted from Historia Natural dos Organismos Aquaticos do Brasil (Natural History of Aquatic Organisms of Brazil), 1964, pp. 343-485. Instituto Oceanográfico, Universidade de São Paulo, São Paulo, Brazil.

CANADA:

Journal of the Fisheries Research Board of Canada, vol. 22, no. 5, Sept. 1965, 216 pp., illus., printed, single copy C\$2. The Queen's Printer, Ottawa, Canada. Some of the articles are: "Fatty acids derived from lipids of marine origin," by P. M. Williams; "Paralytic shellfish poison in sea scallops (*Placopecten magellanicus*, Gmelin)," by N. Bourne; and "Fluctuations in the success of year-classes of whitefish populations with special reference to Lake Erie," by G. H. Lawler.

CASPIAN SEA:

"Okhrana zapasov tsennykh promyslovykh ryb Kaspiiskogo basseina" (Protection of the stock of economically valuable fish of the Caspian basin), by L. S. Berdichevskii, article, Priroda, vol. 10, 1958, pp. 51-54, printed in Russian. Akademiia Nauk SSSR, M. Khariton'yevskii per. 4, Moscow, U.S.S.R.

CIGUATERA:

"Countering a fish poison," by Howard Simons, article, New Scientist, vol. 27, no. 461, Sept. 16, 1965, p. 680, printed, single copy 1s.3d. (about US\$0.20). Cromwell House, Fulwood Pl., High Holborn, London WC1, England.

CLAMS:

Articles from Biological Bulletin, illus., printed, single copy \$3.75. Marine Biological Laboratory, Woods Hole, Mass.:

"Chromosomes of two species of quahog clams and their hybrids," by R. Winston Menzel and Margaret Y. Menzel, vol. 129, no. 1, Aug. 1965, pp. 181-188.

"Reproductive cycle of *Mya arenaria* in New England," by John W. Ropes and Alden P. Stickney, vol. 128, no. 2, 1965, pp. 315, 327.

Development of a Hydraulic Pressure Dredge for Harvesting Clams, Research Development Bulletin No. 15, 4 pp., illus., processed, Sept. 1965. White Fish Authority, 2/3 Cursitor St., London EC4, England. In September 1964, a commercial shellfish operator in the United Kingdom took delivery of a Dutch hydraulic dredge designed for cockle harvesting, and the White Fish Authority took the opportunity to carry out trials with this equipment on a bed of clams. The trials were highly successful, though it was recognized that modifications to the gear could most likely improve its efficiency on clams. A new dredge was built for the Authority and this gear incorporated the proposed modifications. The principle of hydraulic dredging is, basically, that powerful jets of water are directed to the bottom within which species to be caught are recessed. A dredge blade follows the water jet and both blade and jet combine in a loosening-excavating operation and the animals are taken in a following bag.

Large Quahog Clams from Boca Ciega Bay, by Harold W. Sims, Jr., Contribution No. 84, 1 p., printed, 1964. Marine Laboratory, Florida State Board of Conservation, Bayboro Harbor, St. Petersburg, Fla.

Washington Razor Clams; Regulations, 7 pp., illus., printed, 1965. Washington State Department of Fisheries, Rm. 115, General Administration Bldg., Olympia, Wash.

COD:

"Essais de pêche pélagique de la morue au Labrador" (Pelagic fishing explorations for cod off Labrador), by C. Nedelec, article, France Pêche, no. 98, Sept. 1965, pp. 36-38, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

COD AND HADDOCK:

"Beskatningen av torske- og hysebestanden i vare nordlige farvann" (Assessment of the cod and haddock stock in our northern waters), by Arvid Hylen, article, Fiskets Gang, vol. 51, no. 37, Sept. 16, 1965, pp. 539-543, illus., printed in Norwegian. Fiskeridirektoratet, Rådstuplass 10, Bergen, Norway.

COLORADO:

Research in Colorado: Report 1, edited by Richard W. Gregory and W. C. Nelson, 1 vol., illus., printed, 1964. Fisheries Research Division, Colorado Game, Fish, and Parks Department, Fort Collins, Colo.

CONSERVATION:

Compilation of Federal Laws Relating to the Conservation and Development of Our Nation's Fish and Wildlife Resources, compiled under the direction of Warren G. Magnuson, Chairman, Committee on Commerce, U. S. Senate, 486 pp., printed, 1965, \$1.50. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Contains sections on Federal laws on fish and wildlife, general; fish and fisheries; wildlife; water resource statutes relating to fish and wildlife; and other laws relating to fish and wildlife. Some of the laws outlined under the part on fish and fisheries are: Federal aid programs relating to the sport and commercial fishing; fishing vessel construction differential subsidy program; prohibitions and penalties relating to fishing by foreign-flag vessels; United States fishing vessels; fishermen's cooperative associations; medical care for seamen; fishery educational authorities; surplus fishery products; laws implementing international agreements or conventions; and interstate compacts. Other laws relating to fisheries are: authorities relating to specific fish hatcheries and to other facilities; authorities relating to fishery research, studies, and propagation; prohibitions regarding certain fisheries; proclamation on coastal fisheries in certain areas of the high seas; executive order on fishery conservation zones; dogfish shark eradication; management of seals in Alaska; vessels of the Fish and Wildlife Service, and Coast Guard; fishery attaché program; loans to farmers, including fish farmers; and authority for a National Fisheries Center and Aquarium.

CRABS:

"Regulations and the market crab fishery," by Richard Poole and Dan Gotshall, article, Outdoor California.

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vol. 26, no. 9, Sept. 1965, pp. 7-8, illus., printed. State of California, Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.

CRUSTACEANS:

Biologiya Massovykh i Naibolee Obychnykh Vidov Rakobraznykh Barentseva i Be'ogo Morei (The Biology of the Most Abundant and Common Species of Crustaceans of the Barents and White Seas), by V. V. Kuznetsov, 242 pp., illus., printed in Russian, 1964, 1 Ruble 49 Kop. (about US\$1.65). Nauka, Moscow, U.S.S.R.

DANGEROUS FISH:

Poisonous and Dangerous Fish, USSR, by Yevgeniy Sergeyevich Prosvirov, TT: 65-31806, 66 pp., illus., processed, July 29, 1965, \$3. Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.

DENMARK:

"Lovforslag om regulering av fiske-eksporten fra Danmark" (Legislative bill on regulation of fish exportation from Denmark), article, Tidsskrift for Hermetikindustri (Norwegian Cannery Export Journal), vol. 51, no. 7, July 1965, pp. 272-273, printed in Norwegian. De Norske Hermetikfabrikers Landsforening, Stavanger, Norway.

DICTIONARIES:

New Marine and Fisheries Dictionary - Nuevo Diccionario de Pesca y Marina, Spanish-English - English-Spanish, printed in Spanish and English, to be published soon, \$10. Fernando Flores Ltd., 705 N. Windsor Blvd., Los Angeles, Calif. 90038. This forthcoming English-Spanish, Spanish-English dictionary of marine and fisheries terms will be the first of its kind. It will contain complete terminology of commercial fisheries, the entire field of naval terminology, shore and ships, marine gear, fishing gear, names of commercial fish, shore plant terminology, ichthyology, and marine biology. It will be a pertinent, up-to-date, and practical reference book for sailors, merchant seamen, shipbuilders, ichthyologists, marine industrialists and, most of all, fishermen. Only those terms will be included which are of salient importance, of current usage, and which may be indispensable to anyone who fishes for pleasure or profit or writes about the sea and fishing.

DOLPHIN:

"El sonar de los cetáceos" (The sonar of the cetaceans), by Andres Munoz, article, Iberica, vol. 43, no. 36, June 1965, pp. 219-222, illus., printed in Spanish, 18 ptas. (about US\$0.30). Iberica, Palau, 3, Apartado 759, Barcelona-2, Spain.

DRYING:

Food Dehydration. Volume II--Products and Technology, edited by Wallace B. Van Arsdell and Michael J. Copley, 732 pp., illus., printed, 1964, domestic \$23.50, foreign \$24.50. The Avi Publishing Co., Inc., P. O. Box 298, Westport, Conn. This volume is organized into two major sections. The first deals broadly with food dehydration principles and practice applicable generally to all food commodities or a large group of them; the second handles the specific science and technology of individual dehydrated food commodities. This second group is itself organized

into two great divisions: first, the world of plant products, and second, that of animal products. Foods are dried or dehydrated for one or both of the following purposes: to preserve a perishable raw food commodity against deterioration or spoilage under the intended conditions of storage and eventual use; to reduce the cost or difficulty of packaging, handling, storing, and transporting the material by converting it to a dry solid, thus reducing its weight and also, usually but not necessarily, its volume. The intangible quality of convenience may also be served. The introductory chapter is devoted to a simplified statement of the principles of drying. In the second chapter, emphasis is placed on the fact that the "best" drying method for a food product is determined by quality requirements, raw material characteristics, and economic factors. A chapter on dehydration plant operations is devoted to raw material procurement, plant location, plant layout and construction, raw material preparation, finished product handling, and general business considerations. There follow chapters discussing procedures for dehydrating vegetables, potatoes, coffee and tea, dry soups and other dry mixes, fruits, fruit and vegetable juices, dry milk products, and eggs. A chapter on drying of meat, poultry, and fishery products considers the nature of the raw material--structure, physical properties, and chemical composition; effects of physical treatments--heat and denaturation, freezing and thawing; dehydration--drying in the thawed state, and freeze-drying; rehydration; deterioration in freeze-dried meat and fish during storage--reactions involved, and effects of external factors; nutritive value of dehydrated meats; and applied aspects--production of air-dried meat during World War II, developments other than freeze-drying, and freeze-drying of meat. Appendixes contain charts showing moisture contents of various foods, and expected ratios of fresh to dried weights; glossary of some of the technical terms used; and peroxidase test procedure to indicate adequacy of blanching. Each chapter is followed by its own bibliography and a complete index is placed at the end of the volume. The book will be of vital interest to food researchers as well as food processors, distributors, and retailers. Volume I published in 1963 presented a brief history of the food dehydration industry, some data on its growth and present importance in the United States, and a concise statement of scientific principles upon which this food preservation technology is based.

EAST AFRICA:

East African Freshwater Fisheries Research Organization, Annual Report, 1964, 75 pp., illus., printed, 1965, 6s. (about US\$0.85). East African Freshwater Fisheries Research Organization, P. O. Box 343, Jinja, Uganda. Describes the scientific work accomplished during 1964 in the study of the Lake Victoria fisheries; the Nile perch in Lake Victoria; ecology and productivity, especially of young Tilapia; fishery surveys in Kenya and Tanzania; anadromous fish; and mormyrid fish. Also includes a bibliography of recent publications on East African fisheries and related subjects; and appendices of research papers on fisheries.

EAST GERMANY:

"Die fischerei an der Afrikanischen Kuste" (The fishery off the African Coast), article, Fischerei-Forschung, vol. 3, no. 1, 1965, 140 pp., illus., printed in

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

German. Institut für Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, German Democratic Republic.

"Jahresfischereibericht, 1963" (Annual fisheries report, 1963), article, *Fischerei-Forschung*, vol. 2, no. 2, 1964, pp. 1-166, illus., printed in German. Institut für Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, German Democratic Republic.

EXPORTS:

Commercial Exports under A.I.D. Programs, 48 pp., illus., printed, 1965. Office of Material Resources, Agency for International Development, U. S. Department of State, Washington, D. C. 20523. A simple non-technical booklet describing how businessmen in the United States can participate in the export sales opportunities generated by A.I.D.-financed programs of commodity procurement. A.I.D. is not a purchaser of commodities, except in a very few instances, and thus should be regarded only as a financier. The purchasers are foreign businessmen/importers, foreign governments, general contractors for A.I.D.-financed projects, and other U. S. Government Agencies who purchase for A.I.D. The booklet answers the questions: How can you learn of opportunities for A.I.D.-financed business? What are the procedures governing A.I.D. sales? What A.I.D. requirements must be met as you fill the order? How does A.I.D. help to deliver the commodities? How do you get paid under A.I.D. financing? and explains other ways A.I.D. can help you.

FISH COOKERY:

"Delicacies from Louisiana waters," article *Louisiana Conservationist*, vol. 17, nos. 9 & 10, Sept.-Oct. 1965, pp. 12-13, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Presents cook-out recipes for charcoal-grilled red snapper steaks, flounder 'n foil with crab stuffing, and fried yellow perch fillets.

FISH DISEASES:

Fischkrankheiten in Bayern im Jahre 1964 (Fish Diseases in Bavaria in 1964), by H. Reichenbach-Klinke, 2 pp., illus., printed in German. (Reprinted from *Allgemeine Fischerei-Zeitung*, vol. 90, no. 4, 1965.) Landesfischereiverband Bayern e.V., 5 Kaiser Ludwig's Platz, Munich 15, Federal Republic of Germany.

FISHERMEN:

Anatomy of a Fisherman, by John Donaldson Voelker, 117 pp., illus., printed, 1964. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. 10018.

FISH MEAL:

Articles from *Poultry Science*, vol. 44, no. 2, March 1965, printed. Poultry Science Association, Kansas State University, Manhattan, Kans.:

"Biological evaluation of fish meal proteins as sources of amino acids for the growing chick," by R. E. Smith and H. M. Scott, pp. 394-400.

"Measurement of the amino acid content of fish meal proteins by chick growth assay," by R. E. Smith and H. M. Scott, pp. 401-413.

The Effect of Antioxidant Treatment on the Metabolizable Energy and Protein Value of Herring Meal, by

B. E. March and others, 7 pp., printed. (Reprinted from *Poultry Science*, vol. 44, no. 3, May 1965, pp. 679-685.) Poultry Science Association, Kansas State University, Manhattan, Kans.

"To compare the growth rate in chicks by using meat meal as a substitute for fish meal in chick starter ration," by O. P. Agarwala and G. P. Agarwala, article, *Indian Poultry Gazette*, vol. 48, no. 3, Oct. 1964, pp. 82-85, printed. Indian Veterinary Research Institute, Izatnagar, Up. India.

"Fish meal and yeast in poultry feed," by U. P. Kralovanszky and G. M. Szelenyi, article, *Baromfitenyesztes*, vol. 9, no. 4, Apr. 1965, pp. 6-7, printed. Baromfitenyesztes, Posta Kozponti Hirlap Iroda Jozef Nador, Ter. 1, Budapest 5, Hungary.

"New development in small fish meal plants for trawlers and shore installations," article, *Norwegian Fishing and Maritime News*, vol. 12, no. 1, 1965, pp. 15, 45, printed. Norwegian Fishing and Maritime News, P. O. Box 740, Slottsgt. 3, Bergen, Norway.

FISH OIL:

"Aceite de pescado repunta mundialmente" (Fish oil begins to appear worldwide), article, *Pesca*, vol. 10, no. 4, April 1965, pp. 18-20, illus., printed in Spanish with English summary, single copy \$1. Pesca, Av. Wilson 911, Oficina 301, Apartado 877, Lima, Peru.

FISH PRODUCTS:

"Research on fish products outlined," by Roger Berglund, article, *Feedstuffs*, vol. 37, March 27, 1965, pp. 8, 64, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis, Minn. This article covers 3 topics. The first is "Fish meal in turkey feeds." A comparison of the amino-acid composition of turkey rations composed mainly of corn and soybean meal with the amino-acid requirements of the turkey showed that these rations were deficient in certain amino acids, particularly methionine. Supplementing turkey diets with fish meal has several advantages. The fish meal provides (1) a desirable level of energy without fat supplementation; (2) an excellent balance of amino acids without special supplementation; and (3) the available phosphorus required, with a minimum of supplementary dicalcium phosphate. The second of the topics is "Unidentified growth factors in fish products or in fish solubles." From research work the conclusions were: (1) a growth factor did exist, (2) it was not a known vitamin, (3) it was not an essential amino acid, (4) it was not part of the ash, (5) there was more than one form, and (6) it might contain nitrogen. The final topic is "Fish meal in broiler feeds." Broiler body weight and tibia-ash data indicated that phosphorus from fish meal, poultry byproduct meal, and meat and bone meal were equally as available as was phosphorus from feed grade dicalcium phosphate or reagent sodium phosphate.

FISH PROTEIN CONCENTRATE:

"Factors influencing the nutritional value of fish flour. IV--Reaction between 1,2-dichloroethane and protein; V--Toxic material in samples extracted with 1,2-dichloroethane," by A. B. Morrison, M. Licsik, and I. C. Munro, article, *Federation Proceedings*, vol. 23, no. 4, part 1, 1964, p. 877, printed. Federation Proceedings of American Society for Experimental Bi-

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ology, 9650 Wisconsin Avenue NW., Washington, D. C. 20014.

FISH PUMP:

"New trend to boat pumps for shoal fish fleet," article, *The South African Shipping News and Fishing Industry Review*, vol. 20, no. 8, Aug. 1965, pp. 83, 85, 87, illus., printed, single copy 30¢ (about US\$0.45). Thomson Newspapers, South Africa (Pty.) Ltd., 8th Fl., Trust House, Thibault Sq., Box 80, Cape Town, Republic of South Africa.

FISH WASHER:

Fish-Washer Development, Research & Development Bulletin No. 14, 2 pp., illus., processed, Sept. 1965. White Fish Authority, 2/3 Cursitor St., London EC4, England. With the cooperation of a fishing firm, the Industrial Development Unit of the White Fish Authority has developed a fish-washer for use on board trawlers operating from the Port of Granton, England. Those vessels traditionally box the catch at sea, and all gutting and sorting are done in the deck ponds prior to washing. The Granton method requires the deck-sorted fish to be washed and transferred below as units of a single species. The new washer consists of a rectangular tank containing two nylon-covered wire baskets. Down the long sides of the tank are two perforated spray tubes, so arranged that the jets of water play onto the baskets. The cross-section of the tank is such that with the surging of water in the tank, due to ship motion, a sluicing action is given to the mass of water. Spill ports are cut out on the opposite side of the tank to that of the spray pipes; these serve to drain off dirty water and control the level. The method of operation is to tip small baskets of sorted and graded fish into one of the washer baskets and allow the surging and spray action to wash the fish. The baskets are oversize to allow the fish freedom of movement. After washing, the fish are tipped into a second small basket for handling into the fishroom.

FLOUNDER:

Flounders and Their Cousins, Unique Fish, by C. M. C. M. Bearden, Education Release 177, 5 pp., illus., printed. (Reprinted from *South Carolina Wildlife*, winter 1960.) Division of Information and Education, South Carolina Wildlife Resources Department, Box 360, Columbia, S. C.

"The yellow-finned flounder in the Eastern Bering Sea," by N. S. Fadeev, article, *Trudy Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii*, vol. 48, 1963, pp. 281-291, printed in Russian. Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Moscow, U.S.S.R.

FOOD:

Symposium on Foods: Proteins and Their Reactions (The Third in a series of Symposia on Foods Held at Oregon State University), edited by H. W. Schultz and A. F. Anglemier, 482 pp., illus., printed, 1964, domestic \$3, foreign \$3.50. The Avi Publishing Co., Inc., P. O. Box 388, Westport Conn. Presents papers by 18 food scientists, grouped into five sections. The introductory section contains "Personal perspectives in the practice of protein chemistry," by R. David Cole. The section on structure and properties of proteins

offers: "The structure of proteins," by Richard T. Jones; "Apolar interactions in polypeptidyl proteins," by R. R. Becker; and "Denaturation: a requiem," by J. Ross Colvin. Next is a section on protein interaction and degradation containing: "Protein-protein interaction: endothermic polymerization and biological processes," by Max A. Lauffer; "Protein-lipid complexes," by D. G. Cornwell and L. A. Horrocks; "Protein-carbohydrate complexes," by F. R. Jevons; and "Some recent advances in techniques for protein degradation," by Joe R. Kimmel. A section on major protein systems and factors affecting them includes: "The nature of interactions in proteins derived from milk," by Sege N. Nimasheff; "Egg proteins," by Robert E. Feeney; "Meat proteins," by J. R. Bendall; "Fish muscle proteins and some effects on them of processing," by J. J. Connell; "Seed proteins," by Aaron M. Altschul; and "Cereal proteins," by J. S. Wall. The final section on biological effects of protein interactions contains: "The evolution of proteins," by Robert E. Feeney; "Some aspects of the nutritive value of proteins," by A. B. Morrison; "Metabolic antagonists," by William Shive; "Food allergens," by Margaret B. Strauss; "Immuno Chemistry," by Frank Perlman; and a summary of the Symposium--panel discussion. Each paper includes a record of discussion and a complete bibliography. An adequate index concludes the book. Although written in technical phraseology, the book will be useful to anyone in food retailing or wholesaling, and institutional feeding, as well as to those studying or researching food chemistry or technology. It is an authoritative up-to-date reference on proteins and their reactions. The chapter on fish proteins discusses deterioration during frozen storage, changes due to processing, effects of freeze-drying, effects of frozen storage, effects of species variation, and effects of storage near 0° C. (32° F.).

FOOD AND AGRICULTURE ORGANIZATION:

Interession Report (1962-1964) of Technical Committee I Submitted to the 11th Session of the IPFC, Occasional Paper 65/3, 204 pp., illus., processed, 1965. Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Bangkok, Thailand. The first part is a summary report of the activities in fishery biology, oceanography, and limnology of member countries of the Indo-Pacific Fisheries Council (IPFC), and of the Food and Agriculture Organization of the United Nations (FAO) during the Interession period of 1962-64 as compiled by Technical Committee I. The second part is a report on the responses during the Interession period, 1962-64, to recommendations made by the 10th Session of the IPFC regarding work of Technical Committee I or to subjects within its field. The final part is a report of the FAO for the IPFC Interession period 1962-64 on activities relating to the work program of Technical Committee I, IPFC. Appendices include report on unit fisheries as objects of study in fisheries science, the Australian unit fisheries, unit fisheries of the Philippines, computer programs in use for fishery and oceanography purposes, project summaries for Australia, IPFC proposed format for project summaries, and Pacific Ocean data summary charts.

The following revisions, processed in Spanish, to *Directorio de Servicios e Instituciones de Pesca en América Latina* (Directory of Fishery Services and Institu-

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tions in Latin America) (vol. 1) are available from the Regional Office for Latin America, Food and Agriculture Organization of the United Nations, Casilla 10095, Santiago, Chile:

Informacion No. 1 para Actualizar el Directorio de Servicios e Instituciones de Pesca en America Latina (Volumen 1) (Information No. 1 to Revise the Directory of Fishery Services and Institutions in Latin America, Vol. 1), 10 pp., July 1965.

Informacion No. 2 (Information No. 2), 1 p., Sept. 1965.

Nomina de Instituciones y Servicios Consignados, Servicios Gubernamentales de Administracion Pesquera--Argentina (List of Institutions and Assigned Services, Government Services for Fishery Administration--Argentina), 14 pp., July 1965.

Grupo Coordenar do Desenvolvimento da Pesca--Superintendencia do Desenvolvimento do Nordeste--Sudene--Brazil (Coordinated Group for Development of Fishery--Superintendency of Development of the Northeast--Sudene--Brazil), 4 pp., May 1965.

Instituto de Fomento Pesquero--Chile (Institute for Fishery Development--Chile), 12 pp., Aug. 1965.

Departamento Cientifico y Tecnico del Servicio Oceanografico y de Pesca--Uruguay (Scientific and Technical Department for the Fishery and Oceanography Service--Uruguay), 11 pp., April 1965.

FOOD FOR PEACE:

Food for Peace--1964 Annual Report on Public Law 480, 155 pp., illus., printed, 1965, \$1. U. S. House of Representatives, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Includes a short report on the fishery research programs of the Bureau of Commercial Fisheries using foreign currencies under "Food for Peace" (Public Law 480, 83rd Congress). During calendar year 1964, \$212,753 foreign currencies were obligated for the purpose bringing to \$548,220 the total obligated since the beginning of the program in fiscal year 1962. The bulk of the currencies was for use in India, Israel, and Poland.

FRANCE:

"En 1964 la pêche française a franchi un nouveau seuil en mettant à terre plus de 400,000 t de poisson frais et congelé" (In 1964 the French fishery has jumped to a new record in landing more than 400,000 metric tons of fresh and frozen fish), article, La Pêche Maritime, vol. 44, no. 1049, Aug. 1965, pp. 605-611, printed in French, single copy 15 F. (about US\$3.05), Les Editions Maritimes, 190, Blvd. Haussman, Paris, France.

FREEZER TRAWLERS:

"Freezing trawlers for tropical countries," by G. Giansi, article, Annex 1964-3, Bulletin, International Institute of Refrigeration, pp. 189-193, printed, Institut International du Froid, 177, Blvd. Malesherbes, Paris (17^e), France.

FREEZING ON BOARD:

"Fish freezing at sea," by K. A. Oettle, article, Food Industries of South Africa, vol. 17, no. 5, Sept.-Oct. 1964, pp. 51-53, illus., printed, Odhams Press, 16 Bree St., P. O. Box 4245, Cape Town, Republic of South Africa.

"Vertical plate freezer prepares quick-frozen at sea," by A. Muir, article, Canadian Refrigeration and Air Conditioning Journal, vol. 30, no. 6, June 1964, pp. 22-23, illus., printed, National Business Publications Ltd., Gardenvale, Quebec, Canada.

FRESH FISH:

(White Fish Authority Conference) The Handling and Care of Fish at Sea--Papers and Discussions at a Conference Held at Olympia, London, May 31-June 2, 1965, 88 pp., illus., printed, July 1965. Fishing News Ltd., 110 Fleet St., London EC4, England. Contains articles and pertinent discussions on: "Handling, stowage and discharge of catch," by J. J. Waterman; "Supplementary paper," by W. G. F. Carnie; "The chilling of fish on board fishing vessels," by John H. Merritt; "Chilling methods on board (supplementary paper)," by S. Forbes Pearson; and "Antibiotic ice: the advantages (supplementary paper)," by A. P. Hudson. Remaining articles are on: "Freezing trawlers and their equipment," by S. Forbes Pearson; "Supplementary paper," by M. B. F. Ranken; "Freezing fillets at sea," by N. R. Jones; "Offal processing," by S. W. F. Hanson; "Economic size of mother factoryships and catchers," by C. Firkhoff; and "Freezing fillets," by J. J. Diestel. The final section is devoted to short articles on new gear and vessels, such as a slice-ice plant, stern trawlers, ice making machines, a dielectric heating plant for thawing of sea frozen fish, buoys and floats, fish-processing machinery, synthetic fibers for fishing, and plastic containers.

FROZEN FISH:

"Studies on 'spongy meat' formation of frozen cod and Alaska pollock," by T. Tanaka, article, Refrigeration, vol. 40, no. 447, Jan. 1965, pp. 3-13, illus., printed in Japanese. Nihon Reito Kyokai, No. 3, 1-chome, Ginza Nishi, Chuo-ku, Tokyo, Japan.

FUR SEALS:

"Harvesting the stocks of fur seals," by S. V. Dorofeev, article, Zoologicheskii Zhurnal, vol. 42, no. 7, 1963, pp. 1,111-1,113, printed in Russian. Redaktsiya Zoologicheskogo Zhurnala, Podmosenskii per. d. 21, Moscow B-64, U.S.S.R.

GERMAN FEDERAL REPUBLIC:

Selling in Germany, by Robert E. Day, Jr., OBR 65-64, 20 pp., illus., printed, Aug. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

GREECE:

Selling in Greece: Government Procurement Procedures, OBR 65-66, 8 pp., printed, Sept. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

HAWAII:

Proceedings, Governor's Conference on Science and Technology, State of Hawaii, January 26-30, 1965, 183 pp., processed, May 1965. Department of Planning and Economic Development, State of Hawaii, 426 Queen St., Honolulu 13, Hawaii. Purposes of the Conference were: to describe the national and world developments of science and technology, their future impact, and the consequent need for professional, technical, and industrial skills; to describe the present state of the art and probable future direction of selected scientific areas which might have special significance to Hawaii; to emphasize the critical role which the utilization and expansion of Hawaii's science resources can play in the economic growth of the State; and to suggest an action program, and the role of government, industry, and the University of Hawaii in its achievement. Included among many other articles are: "Frontiers of ocean engineering from an industry viewpoint," by Carl H. Holm; "Oceanographic instrumentation and Hawaiian fisheries," by John C. Marr; "Man in the sea program for Hawaii," by Taylor Pryor; "Man in an alien environment," by William Helvey; and "The art of making money in the ocean," by Willard Bascom.

HERRING:

"Biology of White Sea herring fry," by M. N. Konstantinova, article, Trudy Kandalakshskogo Gosudarstvennogo Zapovednika, vol. 4, 1963, pp. 243-245, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

"Some peculiarities in the behavior of herring in a uniform electric field of continuous and pulsating current," by G. B. Daniyulite, article, Trudy Akademii Nauk Lit. S.S.R., Ser. B, vol. 3, no. 32, 1963, pp. 181-194, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

ICELAND:

"Hagnting fiskafians 1964" (Utilization of the fish catches 1964), article, Aegir, vol. 58, no. 12, July 1, 1965, pp. 211-216, printed in Icelandic. Fiskifelag Islands, Reykjavik, Iceland.

ICHTHYOLOGY:

Station Data Errors for Fishes Collected by the Steamer "Blake", by William N. Eschmeyer, 3 pp., illus., printed. (Reprinted from Copeia, no. 2, June 25, 1965, pp. 236-238.) American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif.

IDAHO:

Available from Idaho Fish and Game Dept., 518 Front St., Boise, Idaho:

Federal Aid to Fish Restoration Annual Progress Report for Investigations Project F-49-R-1 (1962), Salmon and Steelhead Investigations, 100 pp., illus., printed, 1965.

Federal Aid to Fish Restoration Job Completion Report for Project F-32-R-6. Tests for Increasing the Returns of Hatchery Trout, February 1, 1963, to February 1, 1964, by Osborne Casey and others, 33 pp., illus., printed, 1965.

INDUSTRIAL PRODUCTS:

"An improved method of processing fish and fish offal," by D. G. Gillies, article, Food Manufacture, vol. 39, June 1964, p. 35, printed. Grampian Press, Ltd., The Tower, Shepherds Bush Rd., Hammersmith, London W6, England.

INTERIOR DEPARTMENT:

United States Department of the Interior--Organization and Functions, 31 pp., printed, 1965. (Reprinted from the United States Government Organization Manual, 1965-66.) U. S. Department of the Interior, Washington, D. C. 20240.

ITALY:

Selling in Italy, by Fernand Lavalée, OBR 65-68, 12 pp., printed, Oct. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

JAPAN:

Actual Condition of Low Grade Fishery Products Processing Industry, Studies on Fishery Economy No. 6, 71 pp., illus., printed in Japanese, Aug. 1965. Planning Section, Fisheries Administration Division, Fisheries Agency, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.

Contributions from the Department of Fisheries and the Fishery Research Laboratory, Kyushu University, no. 10, 1964, 245 pp., illus., printed in Japanese and English, July 1965. Department of Fisheries and Fishery Research Laboratory, Kyushu University, Fukuoka, Japan. Some of the articles are: "Studies on the floating seaweeds. IX--The floating seaweeds found on the sea around Japan," by S. Segawa, T. Sawada, and T. Yoshida; and "Studies on the external mucous substance of fishes. IX--Preparation of crystalline N-acetylneuraminic acid from the external mucous substance of loach," by N. Enomoto, H. Nakagawa, and Y. Tomiyasu.

Present State of Maritime Safety, 126 pp., printed in Japanese, May 1965. Maritime Safety Agency, Tokyo, Japan.

Production of Shallow Sea and Inland Water Fish Farming Industries and Inland Water Fisheries in 1964, Bulletin 40-115 (Suito-14), 7 pp., printed in Japanese, Aug. 1965. Statistics Research Division, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.

Available from the Faculty of Fisheries, Hokkaido University, Hokodate, Japan:

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 15, no. 1, May 1964, 62 pp., illus., printed in Japanese with Japanese summaries. Some of the articles are: "On the analysis of chum salmon scale pattern by use of auto-correlation coefficient," by R. Kawashima and K. Kyushin; "Studies on improvement of salmon gill-nets," by S. Nishiyama and S. Yamamoto; "Studies on the cleaning of air contamination substances from fish processing plants in fishery

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towns. I," by E. Tanikawa, T. Motohiro, and M. Akiba; "Studies on the complete utilization of squid (*Ommastrephes sloani pacificus*). XXI," by E. Tanikawa, M. Akiba, and T. Motohiro; and "Freeze vacuum drying of marine products. IV," by K. Kobayashi and S. Igarashi.

, vol. 15, no. 2, Sept. 1965, 84 pp., illus., printed in Japanese with English summaries. A few of the articles are: "Survey of trawl grounds off the north-west coast of Australia with special reference to hydrographical condition on the grounds," by K. Masuda and S. Nakane; "On the oceanographical condition and the distribution of tuna fish in the Coral Sea in December 1962," by T. Sato and others; "Biochemical studies on muscle of sea animals. III," by A. Iida, K. Oishi, and K. Murata; "Likes and dislikes of fish meat. II; III," by K. Oishi, Y. Tamura, and A. Okumura; "Studies on the complete utilization of squid. XXII," by E. Tanikawa, M. Akiba, and T. Motohiro; and "Studies on keeping freshness of raw fish and shellfish. I," by E. Tanikawa, T. Motohiro, and M. Akiba.

, vol. 15, no. 3, Nov. 1964, 58 pp., illus., printed in Japanese with English summaries. Some of the articles are: "Studies on the fishery of mackerel by purse seines on the sea off southwest Hokkaido. IV," by H. Nakamura and S. Igarashi; "On the measurements of transfer functions related to the fishing training ship *Hokusei Maru*," by T. Sato and N. Sano; "Studies on the compounds specific for each group of marine algae. III," by K. Yabe, I. Tsujino, and T. Saito; and "Studies on complete utilization of squid (*Ommastrephes sloani pacificus*). XXIII," by E. Tanikawa, M. Akiba, and T. Motohiro.

, vol. 15, no. 4, March 1965, 69 pp., illus., printed in Japanese with English summaries. A few of the articles are: "A preliminary note on the effect of hydrostatic pressure on the behavior of some fish," by T. Nishiyama; "On nine warm-current seaweeds new to the northern coast of the Tsugaru Straits," by H. Yamamoto; "Fundamental studies on the phenomena of sticks in gill-netting. I," by K. Nashimoto; and "On some measured examples concerning the form change of salmon drift gill-net during the fishing process in the Okhotsk Sea," by M. Ishida, and others.

Data Record of Oceanographic Observations and Exploratory Fishing. No. 9, March 1965, 349 pp., illus., printed. Presents data gathered during cruises of the *Oshoro Maru*: Cruise 7 to the eastern Indian Ocean from Nov. 1963 to Feb. 1964; Cruise 8 to the south of Cape Erimo in May 1964; Cruise 9 to the northern North Pacific, Bering and Chukchi Sea from June to Aug.; and Cruise 10 to the sea area off Kitami in Sept. Also contains data on cruises by the *Hokusei Maru*: Cruise 15 to the South Pacific Ocean from Oct. 1963 to Jan. 1964; Cruise 16 (1) to the southern Kurile waters in June 1964; Cruise 16 (2) to the southern Kurile waters in June; Cruise 16 (3) to the Okhotsk Sea in July; and Cruise 16 (4) to the Okhotsk Sea in July.

"Early development of several species of Laminariales in Hokkaido," by Hiroshi Yabu, article, *Memoirs of the Faculty of Fisheries, Hokkaido University*, vol. 12, no. 1, 1964, 145 pp., illus., printed.

KOREA REPUBLIC:

Annual Report of Oceanographic Observations, vol. 12, 1963, 173 pp., illus., processed, 1965. Fisheries Research and Development Agency, Seoul, Republic of Korea.

LABOR LEGISLATION:

Part 800--Equal Pay for Equal Work under the Fair Labor Standards Act, WHPC Publication 1119, 13 pp., printed, 1965, 10 cents. (Reprinted from Federal Register, Sept. 9, 1965.) Wage and Hour and Public Contracts Divisions, U. S. Department of Labor, Washington, D. C. 20210. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

LAW OF THE SEA:

"International fisheries and the law of the sea," by Peter A. Larkin, article, *The Fishermen's News*, vol. 21, first issue, Oct. 1965, pp. 5, 10, 12, printed, single copy 15 cents. *The Fishermen's News*, Fishermen's Terminal, Seattle, Wash. 98119. The keynote address to the American Fisheries Society in Portland, Sept. 23, 1965, and the first of a series on the subject of law of the sea as it pertains to fisheries. Discusses in detail the problems of studying the biology of high-seas fisheries, the questions of economics involved, the appearance of large numbers of fishery commissions and councils, and the need "to use the correctly ascertained experience of the past to express a considered and unbiased belief on which future action can be based."

LOBSTER:

"Hummerfangst och hummerundersokningar" (Lobster fishery and lobster research), by Bernt I. Dybern, article, *Svenska Vastkustfiskaren*, vol. 35, no. 17, Sept. 10, 1965, pp. 296-299, illus., printed in Swedish. Svenska Vastkustfiskarnas Centralforbund, Ekonomiskutskottet Postbox 1015, Goteborg 4, Sweden.

"Leturhumarveidarnar vid Island" (Norway lobster fishing off Iceland), article, *Aegir*, vol. 58, no. 13, July 15, 1965, pp. 221-229, illus., printed in Icelandic with English summary. Fiskigelag Islands, Reykjavik, Iceland.

MARINE ALGAE:

"The marine algae of Bahia de Jobos, Puerto Rico," by L. R. Almodovar, article, *Nova Hedwigia*, vol. 7, no. 1/2, 1964, pp. 33-52, printed. Nova Hedwigia, Box 166, Weinheim, Federal Republic of Germany.

Vodorosli Barentseva Morya (Algae of the Barents Sea), by G. Barashkov, 48 pp., illus., printed in Russian, 1962, 6 Kop. (about US\$0.10). Knigoizdat, Murmansk, U.S.S.R.

MEDITERRANEAN:

"Aspectos del crecimiento relativo en peces del Mediterraneo Occidental" (Aspects of the relative growth of fish of the Western Mediterranean), by C. Bas, article, *Investigacion Pesquera*, vol. 27, Oct. 1964, pp. 13-119, illus., printed in Spanish with English summary. Instituto de Investigaciones Pesqueras, Paseo Nacional, s/n, Barcelona-3, Spain.

NETS:

Comparisons of Two Types of Gillnets Used for Lake Survey Purposes in Minnesota-Ontario Boundary

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Waters, by Thomas J. H. Bonde, 11 pp., illus., printed, 1965. Section of Research and Planning, Division of Game and Fish, St. Paul, Minn.

NEW ENGLAND:

The New England Fishing Industry: Functional Markets for Finned Food Fish I, by Joseph F. Farrell and Harlan C. Lampe, Economics of Marine Resources 2, Bulletin 379, 28 pp., illus., printed, June 1965. Publications Office, 16 Woodward Hall, University of Rhode Island, Kingston, Rhode Island 02881. The relevant species-group in this investigation were groundfish (haddock, cod, pollock, flounder, and white hake) and ocean perch. In 1962, the New England catch of fish within this group accounted for 76 percent of all food fish landed in the region. The report covers findings related to market levels in the industry, the markets viewed as levels of demand, the landings market, the wholesaler-processor market, the imports market, the cold storage holdings market, the retail market, and the markets in retrospect--summary and framework for a model.

"The New England fishing industry. II--Impact of Government aid," by Frederick W. Bell, article, New England Business Review, Sept. 1965, pp. 2-9, printed, Federal Reserve Bank of Boston, Boston, Mass. Explains how New England fishermen are planning a fleet expansion during the next 5 years. The impetus for this revival stems from the new technology of stern trawling and even more from the Federal 1964 Fishing Fleet Improvement Act. That Act makes available subsidies ranging up to 50 percent of fishing vessel construction costs. The success of the Act in upgrading and expanding the New England fleet will depend on how it affects the region's competitive position in relation to imported fishery products. For New England as a whole, the Act may reverse the decline in the fleet and stabilize the region's share of the market. The new technology of stern trawling will help raise productivity, while providing increased safety for the crew and higher wages. Both the subsidy and the broader use of stern trawlers will offset some of the advantages of foreign competitors.

NORTH ATLANTIC:

"Osnovnye rezultaty i zadachy promyslovo-okeanograficheskikh issledovaniy v ralone deyatel'nosti mezhdunarodnoi komissii po rybolovstvu v Severo-Zapadnoi Atlantike (IKNAF)" (The main results and tasks of the fisheries and oceanographic studies in the realm of the activities of the International Commission for the North Atlantic Fisheries, ICNAF), by M. Adrov, article, Materialy II konferentsii po problemam Vzalnodeistviya atmosfery i gidrosfery v severnoi chasti Atlanticheskogo okeana (Information on the Second Conference on Problems of the Interaction of the Atmosphere and Hydrosphere in the North Atlantic Ocean), pp. 233-243, printed in Russian, 1964. Leningrad University, Leningrad, U.S.S.R.

NORWAY:

"Det var fiskerne som fant utveien" (It was the fisheries that found their way out of difficulty), article, Konkyljen, vol. 10, no. 1, Jan. 1965, pp. 4-6, illus., printed in Norwegian. Stord Bartz Industri A. S., Bergen, Norway.

"Garantikassen for lottfiskere betalte i 1964 tilskott på over kr. 5.8 millioner" (Guarantee for fishermen's

shares in 1964 paid a contribution of over 5.8 million kroner), article, Fiskaren, vol. 42, no. 33, August 18, 1965, p. 5, printed in Norwegian. Norges Fiskerilag, Postboks 172, Bergen, Norway.

"Lønnsomheten av fiskefartøyer over 40 fot i 1963, sesongresultater" (Profitability of fishing vessels of over 40 feet in 1963-season's results), article, Fiskets Gang, vol. 51, Sept. 2, 1965, pp. 498-509, printed in Norwegian with English summary. Fiskeridirektoratet, Radstuplass 10, Bergen Norway.

NUTRITION:

An Anthology of Food Science. Volume 2--Milestones in Nutrition, by Samuel A. Goldblith and Maynard A. Joslyn, 812 pp., illus., printed, 1964, \$14.25. The Avi Publishing Co., Inc., P. O. Box 388, Westport, Conn. This volume presents some of the important scientific publications and observations of the past 150 years, and particularly of the past 50 years, relating to the nutritional sciences. Food scientists and technologists now are increasingly concerned with the problem of meeting the present and foreseeable world requirement for food. Nutritional adequacy as well as economic availability are basic to such considerations. Included are chapters on the early history of nutrition, the feeding of purified diets and the discovery of the vitamins, vitamin nomenclature, Vitamin A, Vitamin D, the essential fatty acids, and Vitamin B₁. Other chapters cover Vitamin C, riboflavin, nicotinic acid and pellagra, and the multiple nature of the Vitamin B complex, amino acids and proteins, minerals, and the future of nutrition. Bibliographies are included at the end of most of the chapters. As a summary work on nutrition the book will be useful to students and researchers in nutrition, as well as to workers in institutional food preparation.

OCEANOGRAPHY:

"Alvin reaches 6,000 feet in dive," by Larry L. Booda, article, Under Sea Technology, vol. 6, no. 9, Sept. 1965, pp. 20-22, illus., printed, single copy \$1. Compass Publications Inc., 617 Lynn Bldg., 1111 N. 19th St., Arlington, Va. 22209. Alvin, the Navy's first true deep-diving research submarine (as contrasted to the vertical traveling bathyscaph Trieste) reached its design depth of 6,000 feet on July 20, 1965. It uses a high-strength steel sphere as the pressure hull to contain personnel and scientific instruments. The 7-foot diameter sphere is built of 1.33-inch thick HY 100 steel, used for the first time in an undersea vehicle. The 22-foot long, 8-foot beam submersible displaces 13 tons. Surfaced, it has a draft of 8.5 feet. Top speed is 6-8 knots. Cruising speed is 2.5 knots for a submerged range of 20-25 miles. The operating design depth is 6,000 feet with a safety factor of 1.8. Design of Alvin was a cooperative effort of Woods Hole Oceanographic Institution personnel and the Applied Sciences Division of Litton Industries. Alvin is the first phase of the Navy's deep-sea research vehicle program. It will permit on-site observations by oceanographers; biologists will be able to observe directly concentrations and behavior of marine life in deep water.

A Bibliography of the Oceanography of the Tasman and Coral Seas, 1860-1960, by Betty N. Krebs, ITS Bulletin 156, New Zealand Oceanographic Institute Memoir No. 24, 27 pp., printed, 1964. New Zealand Oceanographic Institute, Wellington, New Zealand.

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Marine Science in Denmark and Sweden, by Adrian T. Richards, ONRL 61-62, 15 pp., printed, 1962. Office of Naval Research, U. S. Navy, Washington, D. C.

Oceanography--A Study of Inner Space, by Warren E. Yasso, 176 pp., illus., printed, 1965, \$2.50. Holt, Rinehart, and Winston, Inc., 383 Madison Ave., New York, N. Y. 10017. In his introduction, the author defines the limits of the earth's oceans and presents them in a new perspective when he says, "Truly, the oceans are hardly more than a film of salt water on the surface of our planet!" He goes on to explain the recent recognition of the importance of the oceans, the definition of oceanography and fields of this science, early explorers of the sea, beginnings of deep-sea research in the 19th Century, and United States oceanographic research since 1877. There follow chapters on the chemistry of the sea, oceanic circulation, the earth's structure, topography of ocean basins, oceanic sediments and turbidity currents, and research submersibles. A chapter on marine biology explains life in the oceans, marine environments, plankton organisms, nekton or intermediate and abyssal fish, benthos or bottom-dwelling animals, fish population and the food supply, ocean mammals, and the future of marine biology. The book has a short bibliography, detailed glossary of oceanographic terms, and an adequate index. Written interestingly in layman's language, this book will hold the attention of the general reader as well as high school and college students.

Oceans: An Atlas-History of Man's Exploration of the Deep, edited by George Edmund R. Deacon, 297 pp., illus., printed, 1962. Paul Hamlyn, Spring Pl., London NW5, England.

Serial Atlas of the Marine Environment--Zooplankton Indicator Species in the North Sea, by James H. Fraser; The Trace Elements, by Robert Johnston, Folio 8, illus., printed 1965, looseleaf \$4, bound \$6. Serial Atlas of the Marine Environment, American Geographical Society, Broadway at 156th St., New York, N. Y. 10032.

--Meteorology of the North Sea, by Frank E. Lumb, Folio 9, illus., printed, 1965, looseleaf \$4, bound \$6.

"What reflects sound in the ocean?" article, New Scientist, vol. 27, no. 461, Sept. 16, 1965, p. 697, printed, single copy 1s. 3d. (about US\$0.20). Cromwell House, Fulwood Pl., High Holborn, London WC1, England.

OCEAN PERCH:

"Age and growth rate of the Pacific ocean perch of the Bering Sea," by O. F. Gritsenko, article, Trudy Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozaystva i Okeanografii, vol. 48, 1963, pp. 313-316, printed in Russian. Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozaystva i Okeanografii, Moscow, U.S.S.R.

OYSTERS:

"The accumulation of enteric viruses by the oyster, *Crassostrea virginica*," by T. G. Metcalf and W. C. Stiles, article, Journal of Infectious Diseases, vol. 115, no. 1, 1965, pp. 68-76, printed. University of Chicago Press, 5750 Ellis Ave., Chicago, Ill.

"Contraction in the opaque part of the adductor muscle of the oyster (*Crassostrea angulata*)," by B. M. Millman, article, Journal of Physiology, vol. 173, no. 2, 1964, pp. 238-262, illus., printed. Cambridge University Press, 200 Euston Rd., London NW1, England.

"Dynamic merchandising program needed to develop frozen oyster market," by Duane D. Shelton, article, Quick Frozen Foods, vol. 28, no. 2, Sept. 1965, pp. 97-101, illus., printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019. The author discusses how United States growers seem ready to convert to freezing oysters but need assistance in creating new products and establishing a vital promotional approach. A new generation of oyster farmers is setting a vigorous pace in rebuilding oyster production. Most favorable aspect of future development is that the profitability in oyster production is second to none in the fishing industry.

The Immigrant Oyster (OSTREA GIGAS), Now Known as the Pacific Oyster, by E. N. Steele, 202 pp., illus., printed, 1964, hard bound \$4.50, paper bound \$3.50, plus postage. Pacific Coast Oyster Growers Association, 66 Marion St., Seattle, Wash. 98104. Documents the introduction and development of Pacific oysters from Japan into Puget Sound. The first chapter tells how the oyster spat were selected in Japan and shipped to Washington by two Japanese, how they were planted in Samish Bay, and how the first planting was successful. Following are chapters describing the early years of cultivation, cultivation of Eastern and Olympia oysters, cultivation of Pacific oysters, experiments in artificial seed setting, formation of the Pacific Oyster Growers Association, and the national depression of the 1930's and the Oyster Code. Other chapters tell of the war with Japan and its effect on the Pacific oyster industry, postwar seed from Japan, the Pacific oyster industry entrance into an era of big business in the late 1940's, statistics on production, reproduction of Pacific oysters in the State of Washington, the official recognition by the industry of the economic value of the Pacific oyster, growth of the industry, and processing oysters by canning, freezing, stewing, and smoking. An appendix reports on the fight for the preservation of the Pacific oyster from water pollution. This is an amusing and informative book, of interest to oyster producers and distributors as well as the general reader.

"Seafood chief reports on status of Alabama's oyster industry," by George W. Allen, article, Alabama Conservationist, vol. 35, no. 4, June-July 1965, pp. 16-19, illus., printed. Alabama Department of Conservation, 64 N. Union St., Montgomery, Ala. 36104.

"A system of oyster culture for West Pakistan Coast," by S. Azhar Hasan, article, Agricultural Pakistan, vol. 14, no. 3, 1963, pp. 310-328, illus., printed. Agricultural Pakistan, Central Publications Branch, Block 44, Karachi, Pakistan.

PACIFIC OCEAN:

Abstracts of Symposium Papers, Tenth Pacific Science Congress, Honolulu, Hawaii, 1961, 490 pp., printed. Pacific Science Association, Bernice P. Bishop Museum, Honolulu, Hawaii 96819. In the section on Symposium on Limnology and Freshwater Fisheries, two of the articles abstracted are: "The status of fish passage in the Pacific Northwest," by K. G. Weber, under

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Symposium on Fishery Protection in Relation to Dams and Water Development Projects; and "The Promotion of productivity in the fish farm," by Nobuyuki Kawamoto, under Symposium on Progress in the Culture of Pond Fishes. In the section on Symposium on Marine Biology and Fisheries, some of the abstracts are: under Symposium on Biological and Physical Aspects of Light in the Sea (a) Underwater Light Measurements for Biological Studies, "Luminescence and vision in marine animals," by J. A. C. Nicol; under Symposium on Endocrinology of Fishes, "Hormonal factors in smolting in salmon," by Madeleine Oliveureau and Maurice Fontaine; under Symposium on Factors Affecting the Behavior of Predaceous Marine Fishes, Especially Sharks, "Some aspects of olfactory and visual responses in Pacific salmon," by J. R. Brett and C. Groot, "Visual discrimination in lemon sharks," by Eugenie Clark, "Factors affecting the predaceous behavior of sharks in South Africa," by David H. Davies, "The visual apparatus of sharks and its probable role in predation," by Perry W. Gilbert, "Environmental and behavioral factors which influence the migration of sharks," by A. M. Olsen, "Food of some tropical predaceous fish, including sharks, from net and line fishing records," by A. M. Rapson, "Some environmental factors affecting the feeding behavior of sharks," by Stewart Springer, and "The role of olfaction in shark predation," by Albert L. Tester; under Symposium on immunogenetic concepts in marine population research, "Serology of Atlantic clupeoid fishes," by Carl J. Sindermann, "Studies on the erythrocyte antigens of the skipjack tuna (*Katsuwonus pelamis*)," by Lucian M. Sprague and Leslie I. Nakashima, "On the blood types of yellow-fin and big-eye tuna," by Akimi Suzuki, and "Serological differentiation of sardine subpopulations off California," by Andrew M. Vrooman. Included in the Symposium on Oceanography are abstracted articles under Symposia on Deep Circulation in the Pacific, Equatorial Circulation in the Pacific, North Pacific Circulation, Present and Future Trends in Oceanographic Instrumentation, Radioactive Tracers in Oceanography, and on Tsunamis.

PAKISTAN:

"Marine fisheries of Pakistan, 1--Present status," by N. Alam Khandker, article, *Pakistan Journal of Science*, vol. 15, no. 5, 1963, pp. 214-216, illus., printed, Pakistan Association for the Advancement of Science, Lahore, Pakistan.

PERU:

"Armadores deben 897 millones" (Vessel owners owe 897 million soles), article, *Pesca*, vol. 10, no. 4, April 1965, pp. 12-15, illus., printed in Spanish with English summary, single copy \$1. Pesca, Av. Wilson 911, Oficina 301, Apartado 877, Lima, Peru. A survey of anchovy vessel owners show that possibilities of getting out of debt are poor for those with boats of under 100 tons. Apparently only boats of 160 tons and over are profitable. Anchovy populations lately seem to concentrate far from the traditional fishing grounds; thus larger boats with better nets and equipment are needed for profitable operations.

"Peru consolidates fish meal industry," by D. J. McEachran, article, *Foreign Trade*, vol. 124, no. 8, September 18, 1965, pp. 8-9, illus., printed, single copy C\$0.25. Queen's Printer, Government Printing Bureau, Ottawa, Canada. In only 15 years, Peru has

built up on the anchoveta swarming in the cold Humboldt Current the world's biggest fish meal industry. Production of fish meal for animal feed exceeded 1.5 million metric tons in 1964. It has become the country's largest export. Fish meal sales in 1964 accounted for nearly one-quarter of the country's total exports, overshadowing the output of the basic copper, cotton, and sugar industries. Direct investment in the fish meal industry is now estimated at more than \$300 million. Problems that accompanied this rapid expansion are now being corrected, and the future looks promising, asserts the author.

Principal Manufacturing Industries in Peru. Part 1; Part 2; by Richard H. Mullins, OBR 65-58-A; OBR 65-58-B, 20 pp., 24 pp., printed, Aug. 1965, 15 cents each. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Part 1 contains a section on canned fish, frozen fish, fish meal, and fish oil.

PHYSIOLOGY:

"Electrical and mechanical responses in deep abdominal extensor muscles of crayfish (*Orconectes virilis*) and lobster (*Homarus americanus*)," by Bernard C. Abbott and I. Parnas, article, *Journal of General Physiology*, vol. 48, no. 5, pt. 1, 1965, pp. 919-931, illus., printed. Rockefeller Institute of Medical Research, York Ave. and 66th St., New York, N.Y. 10021.

PLANKTON:

Plankton, vol. 1, no. 10, June 1, 1965; vol. 1, no. 11, June 15, 1965, 4 pp. each, illus., processed. Marine Laboratory, Florida State Board of Conservation, Bayboro Harbor, St. Petersburg, Fla.

POLAND:

Basic Data on the Economy of Poland, by Leon Lewins and Oleg Jerschkowsky, OBR 65-65, 24 pp., printed, Sept. 1965, 15 cents. Bureau of International Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.)

"La Pologne au troisième rang dans la construction mondiale de navires de pêche" (Poland in third place in world construction of fishing vessels), article, *France Pêche*, no. 98, Sept. 1965, pp. 24, 27, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

POLLUTION:

Fish and River Pollution, by J. R. Erichsen Jones, 211 pp., illus., printed, 1964. Butterworth, Inc., 7300 Pearl St., Bethesda, Md.

PORTUGAL:

Estatística das Pescas Marítimas no Continente e Ilhas Adjacentes no Ano de 1963 (Marine Fishery Statistics on the Continent and Adjacent Islands in the Year 1963), 143 pp., printed in Portuguese, 1964. Direcção das Pescarias, Ministério da Marinha, Lisbon, Portugal.

PORTUGUESE WEST AFRICA:

"A pesca na Província de S. Tomé e Príncipe" (The fishery in the Province of Santo Tome and Principe), by Romulo Figueiredo, article, *Boletim da Pesca*, no. 87, June 1965, pp. 11-25, printed in Portuguese. Gabinete de Estudos das Pescas, R.S. Bento, 644, Lisbon, Portugal.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

PRESERVATION:

"Neue Wege zur Herstellung haltbarer fisch-preserven" (New methods for stable preparation of fish preserves), by W. Ludorff, article, *Fette, Seifen, Anstrichmittel*, vol. 65, no. 2, 1963, pp. 139-144, printed in German, Industrieverlag von Herhausen K. G., 24 Rodingsmarkt., Hamburg II, Federal Republic of Germany.

QUALITY:

"Fangtechnik und fischqualität" (Fishing technique and fish quality), by A. von Brandt, article, *Fette, Seifen, Anstrichmittel*, vol. 65, no. 2, 1963, pp. 144-146, printed in German, Industrieverlag von Herhausen K. G., 24 Rodingsmarkt, Hamburg II, Federal Republic of Germany.

RADIATION PRESERVATION:

Application of Radiation-Pasteurization Processes to Pacific Crab and Flounder, Final Summary, Nov. 1963-Oct. 1964, TID-21404, 118 pp., illus., printed, Nov. 1964. Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.

"Radiation and pasteurization of raw and chlortetracycline-treated shrimp," by A. A. Awad, Russell O. Sinnhuber, and A. W. Anderson, article, *Food Technology*, vol. 19, no. 5, 1965, pp. 182-184, printed, single copy \$1.50. The Garrard Press, 510 N. Hickory St., Champaign, Ill. 61823. Reports on a study of extension of the storage life of raw shrimp with pasteurization levels of ionizing radiations in combination with refrigerated storage at 38° F. and chlortetracycline. Levels of irradiation which do not impart a significant irradiation odor or taste (pasteurization radiation threshold) to raw shrimp were determined. Those levels were 0.5 and 0.75 megarad. The storage life of the shrimp irradiated at 0.5 megarad was extended to 5 weeks, compared with 1 week for the unirradiated samples held at the same temperature. During an 8-10 week storage period, the samples which received doses of 0.5 megarad with CTC and those which received 0.75 megarad with and without CTC remained in good condition.

Radiation Pasteurization of Shrimp and Oysters, Final Summary Report for the Period January-December 1964, by Arthur F. Novak and Joseph A. Liuzzo, ORO-626, 29 pp., processed, Jan. 15, 1965. Division of Technical Information, U. S. Atomic Energy Commission, Washington, D. C. (For sale by the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.) During this study, it was found that low-dose gamma radiation employing cobalt 60 can be used to extend the storage life of Gulf shrimp and oysters. Many field trials on consumer acceptance of radiation pasteurized shrimp and oysters were successful according to results obtained from organoleptic, chemical, and bacteriological tests of the products. The procedures employed for obtaining the fresh shellfish, the method of handling and storing, and the time of holding prior to irradiation are factors involved in the keeping qualities after irradiation. Only products of high initial quality can be irradiated successfully. This process should provide advantages to the fisherman, processor, distributor, and consumer. Market prices of shellfish, now subject to fluctuations due to overabun-

dance or scarcity, would tend to be stabilized with the widespread use of this process.

REFRIGERATION:

"Apparatus for shipboard storage and refrigeration of freshly caught fish," by M. J. Poretic, Abstracts from Current Scientific and Technical Literature, vol. 17, Oct. 1964, p. 445, Abstract No. 2407, printed, British Food Manufacturing Research Association, Randalls Rd. Leatherhead, Surrey, England.

Articles from Annex 1964-3, Bulletin, International Institute of Refrigeration, Institut International du Froid, 177, Blvd. Malesherbes, Paris (17^e), France:

"Observations on the possible development of refrigeration application in fish storage and distribution in tropical countries," by J. Gousset and G. Moal, pp. 157-170.

"Refrigeration of fish," by F. Bramsnaes, pp. 143-156.

SALMON:

"Cause of variation in time of maturation of pink salmon spawners in 1962," by V. V. Azbelev and B. V. Ishtoshin, article, *Materialy Rybokhozaystvennykh Issledovaniy Severnogo Basseina*, no. 1, 1963, pp. 32-34, printed in Russian. Polarnyi Nauchno-Issledovatel'skii i Proektnyi Institut Morskogo Rybnogo Khozaystva i Okeanografii, Moscow, U.S.S.R.

"Fecundity of *Oncorhynchus keta* in the Amur River," by T. N. Belyanina, article, *Nauchnye Doklady Vysshei Shkoly, Biologicheskie Nauki*, no. 4, 1963, pp. 24-30, printed in Russian. Gosudarstvennoe Izdatel'stvo "Vysshaya Shkola," Podmosenskii per. 20, Moscow B-62, U.S.S.R.

"Food requirements for salmonids, and the main food used for feeding in artificial culture," by K. A. Faktorovich, article, *Izvestiya Gosniorkh*, vol. 54, 1963, pp. 64-90, printed in Russian. Gosudarstvennyi Nauchno-Issledovatel'skii Institut Ozerogo i Rechnogo Rybnogo Khozaystva, Moscow, U.S.S.R.

A Microcytic Anemia of Juvenile Chinook Salmon Resulting from Diets Deficient in Vitamin E, by Cecil M. Whitmore, Contribution No. 29, 31 pp., illus., printed, March 1965. Oregon Fish Commission Research Laboratory, Rte. 2, Box 31A, Clackamas, Oreg. 97015.

Pituitary Hormones of the Pacific Salmon. I--Response of Gonads in Immature Trout (*SALMO GAIARDNERII*) to Extracts of Pituitary Glands from Adult Pacific Salmon (*ONCORHYNCHUS*), by P. J. Schmidt and others, 10 pp., illus., printed. (Reprinted from General and Comparative Endocrinology, vol. 5, no. 2, April 1965, pp. 197-206.) Academic Press Inc., 111 - 5th Ave., New York 3, N. Y.

"Reproductive ecology of masu (*Oncorhynchus masu*, Brevoort)," by A. I. Smirnov, article, *Dokl. Akad. Nauk SSSR Biol. Sect.*, no. 1543 (1/6), 1962, pp. 334-336, illus., printed in Russian. Akademiya Nauk SSSR, Podmosenski per. 21, Moscow B-64, U.S.S.R.

Articles from Voprosy Ikhtologii, printed in Russian. Akademiya Nauk SSSR, Ikhtologicheskaya Komissiya, Moscow, U.S.S.R.:

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Growth and structure of the pink salmon scale," by R. I. Enyutina, vol. 3, no. 4, 1963, pp. 751-754.

"Helminths as biological indicators of the local stock of anadromous Amur salmon (*Oncorhynchus*)," by A. Kh. Akhmerov, vol. 3, no. 3, 1963, pp. 536-555.

"Influence of predators on the young of *Oncorhynchus gorbusha* (Walb.) and *Oncorhynchus keta* (Walb.) in the White and Barents Seas," by E. L. Bakshtanskii, vol. 4, no. 1, 1964, pp. 136-141.

SARDINES:

"Effektivt sardinproduksjon i Maine" (Efficient sardine production in Maine), article, *Tidsskrift for Hermetikindustri* (Norwegian Canners Export Journal), vol. 51, no. 8, August 1965, pp. 288-289, illus., printed in Norwegian. De Norske Hermetikfabrikers Landsforening, Stavanger, Norway.

"Nuevas preparaciones de alachas (sardina) en conserva en Túnez" (New canned products of anchovy (sardine) in Tunisia), article, *Informacion Conservera*, vol. 13, no. 136-137, April-May 1965, pp. 148-150, 151-153, illus., printed in Spanish, single copy 30 ptas. (about US\$0.50). Informacion Conservera, Garrigues, 21, Valencia-1, Spain.

SAURY:

Japanese Canned Saury, 8 pp., illus., printed in Japanese. Japan Canned Saury Packers Association, No. 18, 2-chome, Marunouchi, Chiyoda-ku, Tokyo, Japan.

SEALS:

"K voprosu o pitanii grenlandskogo tyulenyia" (The feeding habits of the harp seal—*Phoca groenlandica*), by Yu. K. Timoshenko, article, *SS. Nauch. Issled. Rabot. Sev. Otd. Polyarnogo Nauch. Issled. Proekt. Inst. Morskogo Rybn. Khoz. Okeangr.*, 1962, pp. 48-52, printed in Russian. Institut Morskogo Rybnogo Khoziaistva i Okeanografi im. N. M. Knipovicha, Murmansk, U.S.S.R.

SEAWEED:

Methods for Increasing Production of Edible Seaweeds, by Shunzo Suto, Fisheries Propagation Series 9, 36 pp., printed in Japanese, June 1965. Japan Fisheries Conservation Association, 6th Fl., Zenkoku Choson Kaikan, 17-banchi, 1-chome, Nagata-cho, Chiyoda-ku, Tokyo, Japan.

SHAD:

"Susquehanna River shad study," by Frank T. Carlson, article, *Pennsylvania Angler*, vol. 34, no. 10, Oct. 1965, pp. 1-7, illus., printed, single copy 25 cents. Pennsylvania Fish Commission, South Office Bldg., Harrisburg, Pa.

SHRIMP:

"Biology of shrimps in the western Gulf of Alaska," by B. G. Ivanov, article, *Trudy Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografi*, vol. 48, 1963, pp. 207-218, printed in Russian. Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografi, Moscow, U.S.S.R.

"Dans les eaux de Guyane, l'échec d'une aventure crevetière" (In the waters off Guiana, the end of a shrimp fishing venture), by Lucien Gourong, article, *France*

Pêche, no. 98, Sept. 1965, pp. 28-32, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

"Effects of injected biological stains on oxygen uptake by shrimp," by Zoula P. Zein-Eldin and Edward F. Klima, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 277-278, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

"Growth and survival of postlarval *Penaeus aztecus* under controlled conditions of temperature and salinity," by Zoula P. Zein-Eldin and David V. Aldrich, article, *Biological Bulletin*, vol. 129, no. 1, 1965, pp. 199-216, printed. The Marine Biological Laboratory, Woods Hole, Mass.

SMALL BUSINESS MANAGEMENT:

Tax Guide for Small Business, 1966, Publication No. 334, 160 pp., illus., printed, 1965, 50 cents. Internal Revenue Service, U.S. Treasury Department, Washington, D. C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.) A guide for use in filing the 1965 income tax returns, excise tax returns, and other returns for 1966. Answers the Federal tax questions of corporations, partnerships, and sole proprietorships. Explains in plain layman's language the tax results from buying, starting, operating, and the sale and other disposition of a business. In addition, contains a tax calendar for 1966 which should prove helpful to the businessman throughout the year, since it indicates what he should do and when he should do it in regard to the various Federal taxes. Also has a checklist of special interest to the man just starting in business in that it affords a quick method for determining for what taxes he may be liable. This edition has been brought up to date and includes explanations of the provisions of the new tax laws, as they affect businessmen. Some of the changes discussed are new lower rates, income averaging, travel expense rules, interest on certain deferred payments, and disposition of depreciable property.

SPAIN:

"Conservas Espanolas en crisis" (Spanish canned fishery products in crisis), article, *Pesca*, vol. 10, no. 4, April 1965, pp. 32-34, illus., printed in Spanish with English summary, single copy \$1. Pesca, Av. Wilson 911, Oficina 301, Apartado 877, Lima, Peru.

Investigacion Pesquera, vol. 28, April 1965, 246 pp., illus., printed in Spanish with English summaries. Instituto de Investigaciones Pesqueras, Paseo Nacional, s/n, Barcelona-3, Spain. Some of the articles are: "Edad y crecimiento de la merluza (*Merluccius merluccius* L.) del noroeste del Mediterraneo Espanol" (Age and development of the hake of the northwest Spanish Mediterranean), by A. Figueras; "Sobre la dinamica de la pesqueria de arrastre de Castellon" (On the dynamics of the trawl fishery of Castellon), by M. G. Larraneta and P. Suau; "Empleo de metabisulfito potasico en la conservacion y prevencion del ennegrecimiento (melanosis) de los crustaceos" (Use of potassium metabisulfite in the conservation and prevention of blackening of crustaceans), by Rafael Establier; "Composicion quimica estacional de la carne de langostino, *Penaeus kerathurus* (Forakal, 1775) y consideraciones biologicas" (Seasonal chemical

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

composition of the meat of the shrimp, *Penaeus kerathurus* Forskal 1775, and biological considerations), by F. Munoz; and "Estudio del crecimiento del bogavante (*Homarus vulgaris* Milne Edwards) del noroeste Español" (Study of the development of the lobster, *Homarus vulgaris* Milne Edwards, of the Spanish northeast), by A. Figueras.

"Pesquerias, producción y técnica" (Fisheries, production, and technique), by V. Paz-Andrade; "Panorama actual de la pesca Española" (Present view of the Spanish fishery), by D. Ignacio del Cuvillo y Merello; "El crecimiento anual de la flota pesquera española" (The annual growth of the Spanish fishing fleet); "La normalización de buques en la renovación de la flota pesquera" (The standardization of vessels in the renewal of the fishing fleet); "Los puertos y la pesca en 1964" (The ports and the fishery in 1964); "Balanza exterior del comercio pesquero Español en 1964" (The balance of foreign trade in Spanish fishery products in 1964); "La pesca y la evolución de la flota" (The fishery and the development of the fleet), by Mariano Lobo Andradá; "Conservas 1964: evolución favorable" (Canning in 1964: favorable development); and "1964 producción pesquera marítima Española" (1964 Spanish marine fishery production), articles, *Industrias Pesqueras* (Statistics Annual for 1964), vol. 39, nos. 913-914, May 15, 1965, pp. 173, 175, 178-179, 181-182, 183, 185, 187, 188-190, 198-200, 219, 221, 224-225, 227, 240-241, 248-249, 251, 253-255, illus., printed in Spanish. *Industria Pesqueras*, Apartado 35, Vigo, Spain.

"Los rendimientos en la experiencia de la pesca de arrastre" (The annual production in the experimental trawl fishery), by P. Suau, article, *Puntal*, vol. 12, no. 137, Aug. 1965, pp. 10-13, 15, illus., printed in Spanish, single copy 20 ptas. (about US\$0.35). *Puntal*, Apartado de Correos 316, Alicante, Spain.

SPINY LOBSTER:

"INOS chairman describes probe into promising shrimp and prawn stocks"; "Growing market in Europe for live rock lobster"; "How long will Vema rock lobster last?"; articles, *The South African Shipping News and Fishing Industry Review*, vol. 20, no. 6, June 1965, pp. 81-83; 85, 87; 91, 93, illus., printed, single copy 30¢ (about US\$0.45). Thomson Newspapers, South Africa (Pty.) Ltd., 8th Fl., Trust House, Thibault Sq., Box 80, Cape Town, Republic of South Africa. The first article discusses a large new venture operating along the coast of Mozambique, now at the stage where it can catch and process shrimp, spiny lobster, and other fishery products on a satisfactory commercial scale. The second tells how from a difficult start on a small scale only 2 years ago, the export of live spiny lobsters by air to Europe is growing into a flourishing section of the South African fishing industry. Opened in France, the market is now expanding to other European countries and exports are reported to be averaging 30-40 tons a month. The final article poses and answers the question of whether the spiny lobster stocks on the Vema seamount will prove to be a lasting valuable new asset or no more than a transient bonanza to be drained of its stocks in a brief burst of uncontrolled fishing.

Notes on Postlarvae of *PANULIRUS ARGUS*, by Rose Witham, Robert M. Ingle, and Harold W. Wims, Jr.,

Contribution No. 13, 98 pp., illus., printed, 1964. Marine Laboratory, Florida State Board of Conservation, Bayboro Harbor, St. Petersburg, Fla.

SPRAT:

"Experimental and commercial preservation of Caspian sprats with sodium pyrosulfite for the production of fish meal," by S. V. Ezerskii, article, *Trudy Instituta Ikhtologii i Rybnogo Khozyaistva*, vol. 4, 1963, pp. 211-233, printed in Russian. *Akademiia Nauk Kazakh SSSR*, Alma-Ata, Kazakh S.S.R.

STERN TRAWLING:

Stern Trawling Conference, Grimsby, England, 1963, edited by George Ward, 102 pp., illus., printed, 1964. Fishing News (Books), Ltd., Ludgate House, 110 Fleet St., London EC4, England.

STURGEON:

"Food for small sturgeons," by V. V. Bal' and L. S. Korochlina, article, *Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya*, no. 6, 1963, pp. 93-94, printed in Russian. *Izdatel'stvo Krasnodarskogo Instituta Tishchevoi Promyshlennosti*, Ul. Kransnaya, 135, Krasnodar, U.S.S.R.

"Growth of Siberian sturgeon, *Acipenser baeri* Brandt, in Lena River," by L. I. Erkalov, article, *Byulleten' Moskovskogo Obshchestva Ispytatelei Prirody, Otdel. Biologicheskii*, no. 3 (supplement), 1964, p. 150, printed in Russian. *Moskovskogo Universiteta*, Moscow, U.S.S.R.

Articles from *Trudy Vses. Nauch. Issled. Inst. Morsk. Rybn. Khoz. Okeanogr.*, vol. 52, 1964, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010;

"Biologiya i promysel kaspiskoi belugi" (Biology and fishery of the Caspian beluga sturgeon *Huso huso*), by N. Ya. Babushkin, pp. 183-258.

"Osetrovy SSSR i ikh vosproizvodstvo" (Sturgeons of the U.S.S.R. and their production), by N. I. Kozhin, pp. 21-58.

"Osetry severo-zapadnoi chasti Chernogo morya" (Sturgeons of the northwestern Black Sea), by A. I. Ambroz, pp. 287-347.

SWEDEN:

Establishing a Business in Sweden, by Grant Olson, OBR 65-62, 12 pp., printed, Aug. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

THAWING:

"Dielectric thawing for frozen foods," by Leo Walter, article, *Canner/Packer*, vol. 134, Feb. 1965, pp. 36-37, printed. Vance Publishing Co., 59 E. Monroe St., Chicago, Ill. 60603.

TRADE LISTS:

The U. S. Department of Commerce has published the following mimeographed trade lists. Copies may be obtained by firms in the United States from the Commercial Intelligence Division, Office of International Trade Promotion, Bureau of International Commerce,

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U. S. Department of Commerce, Washington, D. C. 20230, or from Department of Commerce field offices for \$1 each. List names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm:

Canneries and Frozen Foods--Producers and Exporters--Brazil, 14 pp., Sept. 1965.

Canneries and Frozen Foods--Producers and Exporters--Guatemala, 7 pp., Sept. 1965.

Canneries and Frozen Foods--Producers and Exporters--India, 21 pp., Sept. 1965.

Canneries and Frozen Foods--Producers and Exporters--Mexico, 15 pp., Sept. 1965.

TRAWLERS:

"Insulating foams on trawlers," by J. J. Waterman, article, *World Fishing*, vol. 14, March 1965, pp. 52-53, printed. Grampian Press Ltd., The Tower, 229-243 Shepherd's Bush Rd., Hammersmith, London W6, England.

TROUT:

"How long are the trout fresh?" article, *New Scientist*, vol. 27, no. 461, Sept. 16, 1965, p. 688, printed, single copy 1s. 3d. (about US\$0.20). Cromwell House, Fulwood Pl., High Holborn, London WC1, England.

Some Migratory Habits of the Anadromous Dolly Varden, SALVELINUS MALMA (Walbaum) in Southeastern Alaska, by Robert H. Armstrong, Research Report 3, 36 pp., illus., processed, 1965. Department of Fish and Game, Subport Bldg., Juneau, Alaska 99801.

Untersuchungen zur Epidemiologie und Ökologie der Forellenseuche (Research on the Epidemiology and Ecology of Trout Diseases), by H. Liebmann and H. H. Reichenbach-Klinke, 20 pp., illus., printed in German with English summary. (Reprinted from *Archiv für Fischereiwissenschaft*, vol. 15, no. 2, Oct. 1964, pp. 94-113.) Bundesforschungsanstalt für Fischerei, Palmallee 9, Hamburg-Altona 1, Federal Republic of Germany.

TUNA:

"Individual'nyi impul'snyi apparat dlya lova tuntsa" (Individual pulsing apparatus for the capture of tuna), by I. F. Pisarevskii, article, *Trudy Baltiiskogo Nauch. Issled. Inst. Morsk. Rybn. Khoz. Okeanogr.*, vol. 9, 1962, pp. 160-161, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

"Oceanography and the ecology of tunas," by Maurice Blackburn, article, *Oceanography and Marine Biology: an Annual Review*, vol. 3, pp. 299-322, printed, 1965. George Allen and Unwin, Ltd., 40 Museum St., London WC1, England.

"Pêche et biologie du germon" (The fishery and biology of the albacore tuna), by Edouard Priol, article, *France Pêche*, no. 98, Sept. 1965, pp. 45-48, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

TURKEY:

Balık ve Balıkçılık (Fish and Fishery), vol. 13, no. 8, Aug. 1965, 32 pp., printed in Turkish with English table of contents. Et ve Balık Kurumu G. M., Balıkçılık, Mudurlugu, Besiktas, Istanbul, Turkey. Contains articles on: "Most valuable raw material of perfume industry, ambergris," by Emekli Koramiral; and "Technological developments in the field of fish flour (Part V)," by Hikmet Akgunes.

Market Factors in Turkey, by Donald R. Trafton, OBR 65-63, 12 pp., printed, Aug. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

UNDERWATER PHOTOGRAPHY:

"Attempts to take photographs underwater," by O. F. Khludova, article, *Trudy Okeanograficheskoi Komissii*, vol. 14, 1962, pp. 30-38, printed in Russian. Akademiya Nauk SSSR, Moscow, U.S.S.R.

UNITED KINGDOM:

Fisheries of Scotland Report for 1964, Cmnd. 2644, 140 pp., printed, July 1965, 9s. 6d. (about US\$1.35). Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland. (For sale by Sales Section, British Information Services, 845 Third Ave., New York, N. Y. 10022.) Discusses highlights of the Scottish fisheries in 1964, means of capture and persons engaged in the fisheries, herring fishery, white fish fishery, shellfish fishery, industrial products, enforcement of fishery regulations, salmon fisheries, fisheries research, and harbor facilities. Appendices include information on herring distribution and disposal of landings, herring landings by area, herring methods of capture, white fish landings, salmon fisheries seasons and landings, Report of the Director of Fisheries Research, research by the Scottish Marine Biological Association, construction and improvement of harbors, and fisheries administration. Also contains statistical tables showing persons employed in the Scottish fisheries; production of fishery byproducts; landings of herring by British vessels; quantity and average price of demersal fish by species; quantity and value of fish landed by foreign vessels; and other related data.

U.S.S.R.:

"Bibliografiya po probleme 'Teoreticheskie cherty raznoobraznogo ispol'zovaniya, vosproizvodstva i povysheniya rybnikh i nerybnikh resursov Belogo morya i vnutrennykh vodoev Karel'ii'" (Bibliography on the problem "Theoretical bases of the rational utilization, production and increase of fish and non-fish resources of the White Sea and Karelian inland waters"), by R. A. Niskanen, article, *Problemy Ispol'zovaniya promyslovyykh resursov Belogo morya i vnutrennykh vodoev Karel'ii* (Problems of Exploitation of the Commercial Resources of the White Sea and of Karelian Inland Waters), pp. 104-300, printed in Russian, 1963. Akademiya Nauk SSSR, Leningrad, U.S.S.R.

"Poima srednei Obi i vozmozhnosti uluchsheniya ee rybkhozyaistvennogo ispol'zovaniya" (Floodlands of the middle Ob and possibilities for improved utilization in commercial fishing), by E. G. Iogansen, A. N.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Petkevich, and Ya. I. Marusenko, article, Izvest. Vses. Nauchn.-Issled. Inst. Ozerogo i Rechnogo Rybn. Khoz., vol. 44, 1958, pp. 29-48, printed in Russian. Akademiia Nauk SSSR, Leningrad, U.S.S.R.

"Rybnoe khoziaistvo Vostochnoi Sibiri" (Eastern Siberian fisheries), article, Tr. Sibirsk. Otd. Gos. Nauch. Issled. Inst. Ozer. Rechn. Rybn. Khoz., vol. 8, 1964, pp. 1-306, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

Articles from Priroda, 1964, printed in Russian. Akademiia Nauk SSSR, M. Khariton'yevskii per. 4, Moscow, U.S.S.R.:

"Electric fishing," by Yu. A. Shemanskii, p. 119.

"Fur seals," by S. V. Makarov, pp. 57-64.

VESSELS:

"Fløytlinefis med frysebater" (Floating long-line fishery with freezer boats), by Olav Aasen, article, Fiskets Gang, vol. 51, no. 29, July 22, 1965, pp. 419-424, illus., printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

WEST AFRICA:

"Cold storage for West Africa," article, Fishing News International, vol. 4, no. 3, July-Sept. 1965, pp. 308-309, illus., printed, single copy 6s. 6d. (about US\$0.95). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England. Tells how, to meet the needs of local and international markets, a chain of refrigeration installations was built along the West African coast. In 1956 an active fisheries center was started in Dakar, Senegal, when the fishing fleets started to organize in all ports capable of providing facilities. From then until 1962 expansion proceeded along progressive lines, following the independence of all the former British or French West African colonies. Other countries also began to take part.

WHALING:

"How the scientist helps the fisherman: unchecked exploitation," by D. E. Gaskin, article, Commercial Fishing, vol. 3, no. 12, Aug. 1965, pp. 25, 27, 29, illus., printed. Trade Publications Ltd., 26 Albert St., Auckland, New Zealand. Discusses the rapid decline of the world whaling industry, underlining the basic and urgent need for rational fisheries to be established in every part of the world.

"Hvalfangst i Antarktis i sesongen 1964/65" (Whaling in the Antarctic in the 1964/65 season), article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 54, no. 8, Aug. 1965, pp. 177-178, 181-182, 185-195, printed in Norwegian and English. Hvalfangerforeningen, Sandefjord, Norway.

WHITE SEA:

"Opyt razvedki promyslovykh skoplenii mollyuchov v Onezhskom zalive Belogo Morya" (Data on the search for commercial accumulations of mollusks in the Onega Bay of the White Sea), by L. V. Koval'chuk and Z. G. Palenichko, article, Izvest. Karelsk. i Kol'sk. Fil. Akad. Nauk SSSR, vol. 2, 1959, pp. 88-92, printed in Russian. Akademiia Nauk SSSR, Leningrad, U.S.S.R.

"Pitanie donnykh ryb v zapadnoi chasti Belogo morya" (The feeding of bottom fishes in the western White Sea), by L. A. Kuderskii and M. N. Rusanova, article, Uch. Zap. Karelskogo Gos. Pedagog. Inst., vol. 15, 1964, pp. 221-300, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

YUGOSLAVIA:

Foreign Trade Regulations of Yugoslavia, by Arthur J. Laemmerzahl, OBR 65-49, 8 pp., printed, July 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)



SEA ANIMALS SHOW RESISTANCE TO DISEASE

Fish and other creatures of the sea seem to have fewer infections and fewer cancers than land animals.

In a study of how primitive animals manage to cope with infectious diseases, 200 fish are under careful observation for the Variety Children's Research Foundation, a nonprofit organization conducting research in children's diseases.

Fifty sharks and 150 other varieties of fish swim around in large tanks and are readily identified by colored nylon tags, harmlessly attached to the cartilage of their dorsal fins.

The continuing program is being conducted by Dr. Michael Sigel and Dr. L. William Clem, at the Lerner Marine Laboratory near Miami, Fla. (Science News Letter, November 7, 1964.)

ANTARCTIC SEAL "LANGUAGE" STUDIED AND RECORDED IN UNDERWATER CHAMBER

United States scientists have used a unique new observatory--a chamber suspended in frigid Antarctic waters beneath 5 feet of solid ice--in an effort to learn the meaning of the clamor of seal voices that fills the dark ice-covered seas surrounding the south polar continent.

Biologists from the Woods Hole Oceanographic Institution and the New York Zoological Society cooperated in the project, which was funded by a grant from the National Science Foundation as part of the U. S. Antarctic Research Program.

Late in 1964, the biologists took turns over a 2-week period sitting alone in the 6-foot-high and 4-foot-wide steel capsule. Observers entered through a "chimney" extending to the surface, and viewed through six windows encircling the chamber. They listened to sounds piped in from hydrophones in the water outside. The range of the hydrophones was more than 5 miles, and the observers could hear hundreds of seals they could not see. (Floodlights attached to the chamber provided visibility for only a little over 200 feet.)

The chamber hung 7 feet below the ice in a 1,000-foot-deep area of McMurdo Sound.

Observers stated that the noises they heard were most closely described as whistles, buzzes, beeps, and chirps, and often sounded like something unearthly.

The animal responsible for the noises was the Weddell seal, an Antarctic species that grows up to about 11 feet in length and 1,300 pounds in weight.

"I've never heard such an underwater racket before," commented one authority on whale and seal sounds. "The Weddell surpasses all other seals that have been studied in the variety, amount, and power of the sound it produces, and in this ability is equalled among marine mammals only by some toothed whales."

The hydrophone arrangement made it possible to calculate the depth at which each sound was made. The zoologists explained that this is important because Weddells hunt for fish at considerable depths in total darkness, and are likely to use any possible sonar talent there.

Observers in the chamber reported that they saw few fish, but that a strikingly colored jellyfish with an umbrella 4 feet across and tentacles 30 feet long once floated by.

One of the leaders of the project said, "All the sounds we hear undoubtedly serve one or more purposes. Perhaps the Weddells use them for communication and, as with bats and whales, for sonar navigation. Sonar would explain how they find food and breathing holes, especially in the total darkness of the long Antarctic winter night.

"We will carefully analyze this jumble of sounds, together with our field observations, in the laboratory for clues to the 'language.' The sound tracks must be analyzed with instruments for full understanding, because seal voices have many characteristics that humans cannot hear, such as very high frequencies and rapid pulses too close together to distinguish. This process will take several months, and the conclusions must be proven by experiments with captive seals."

He added that the investigators will also try to figure out how the seals make the weird sounds. Weddells keep their mouths and nostrils shut tight underwater.

A SCUBA diving team provided supplementary observations and photographs. The divers could hardly hear the seals during their SCUBA explorations, but while in the chamber learned to associate certain throat and head movements with particular sounds. When diving they could "lip read" the sounds for their notes on behavior.

Antarctica is particularly suited to investigations of seal behavior because of the clarity of the water and the low level of noise from other sources. Facts learned about Antarctic seals may possibly apply to species in other parts of the world. (National Science Foundation, November 30, 1964.)

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HIGHLIGHTS IN THIS ISSUE (JANUARY 1966)



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